The Mining Journal

LONDON, FEBRUARY 14, 1958

Vol. 250. No. 6391. Price Ninepence

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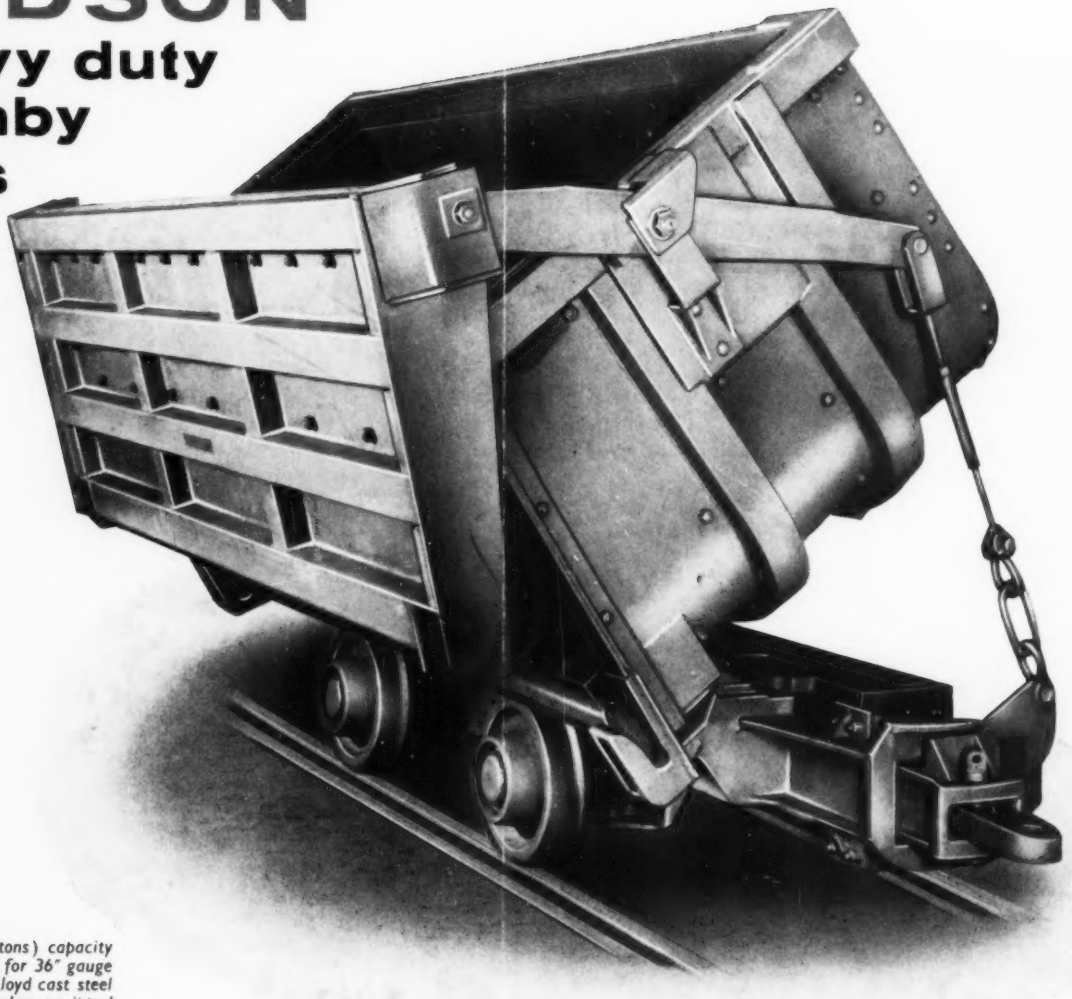

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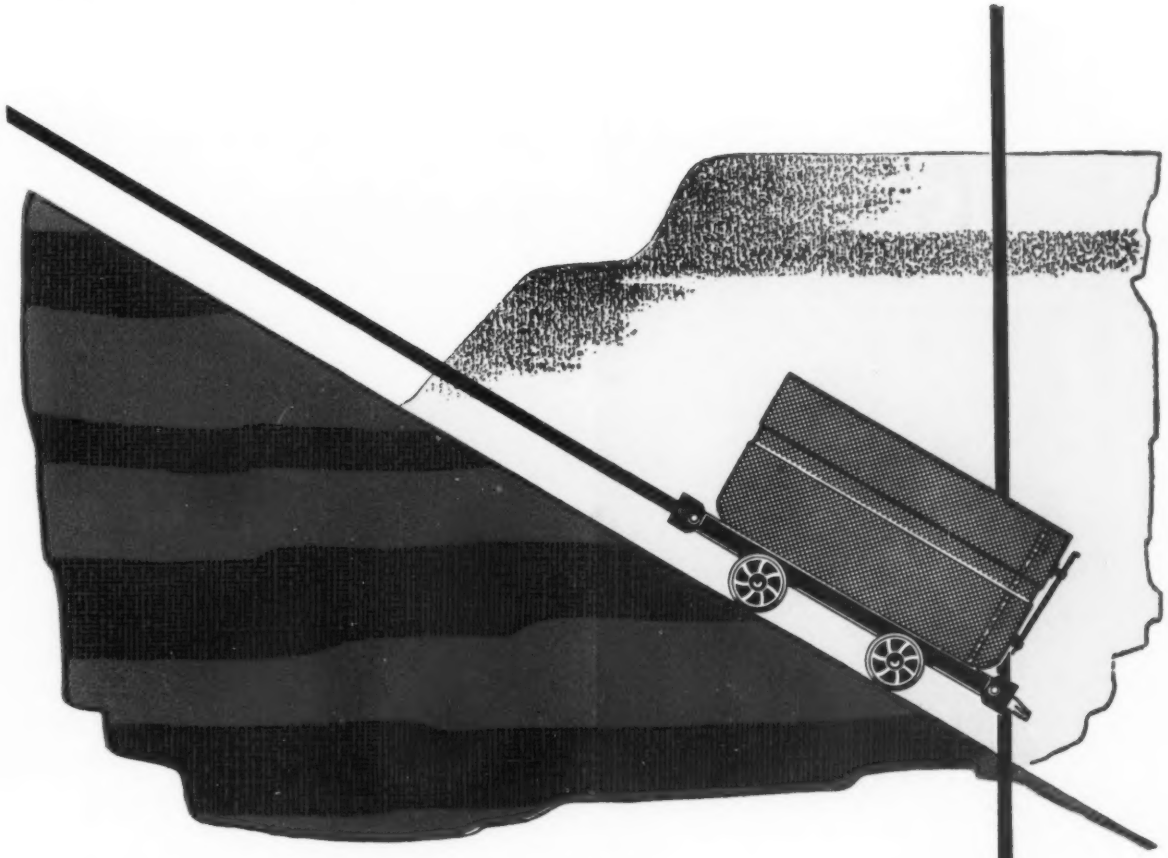

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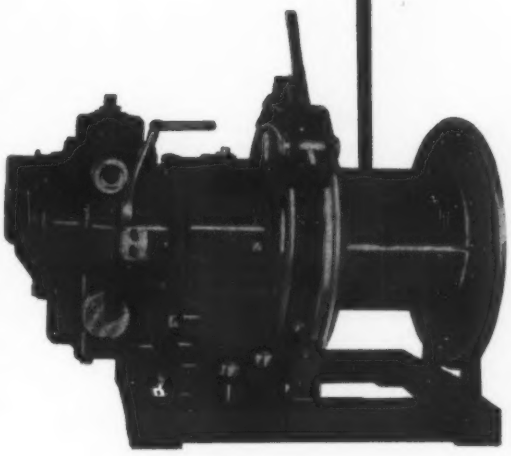

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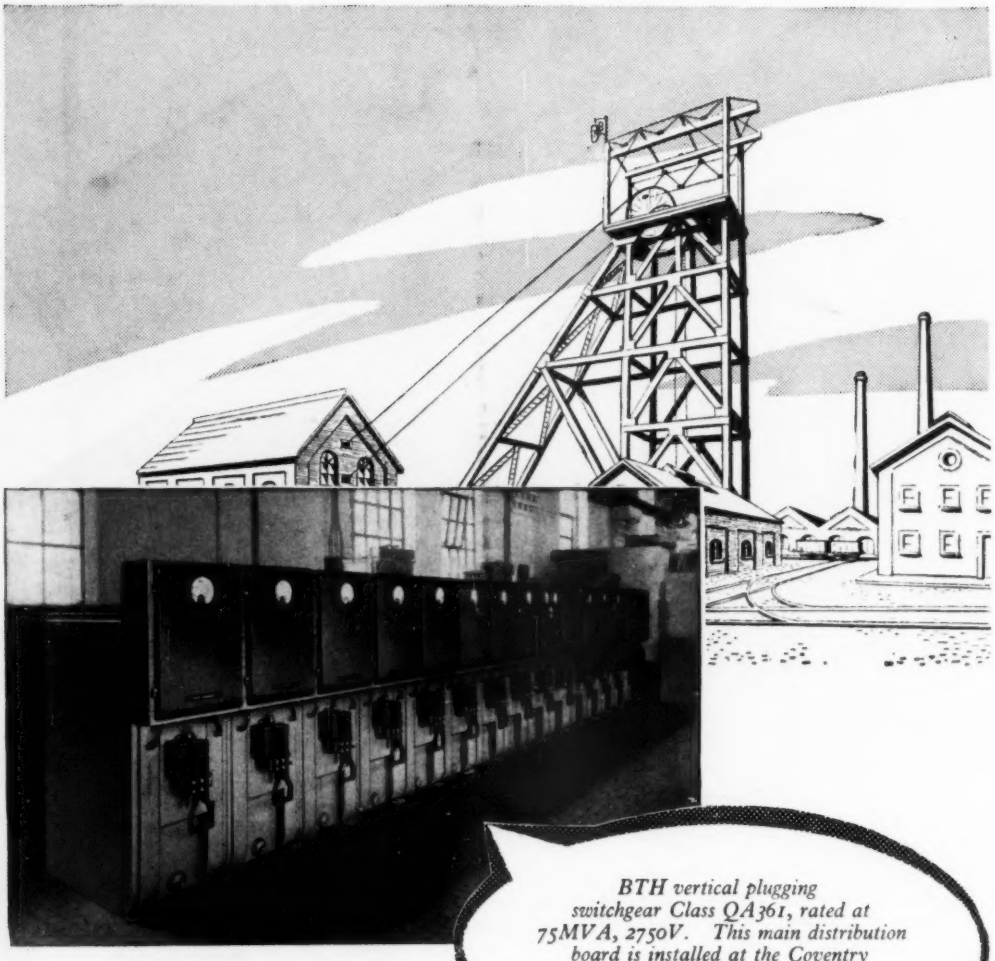

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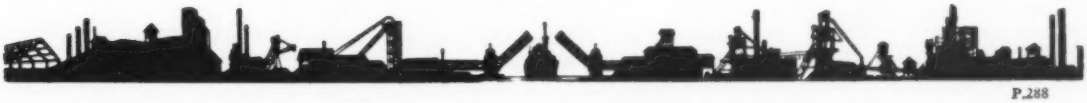

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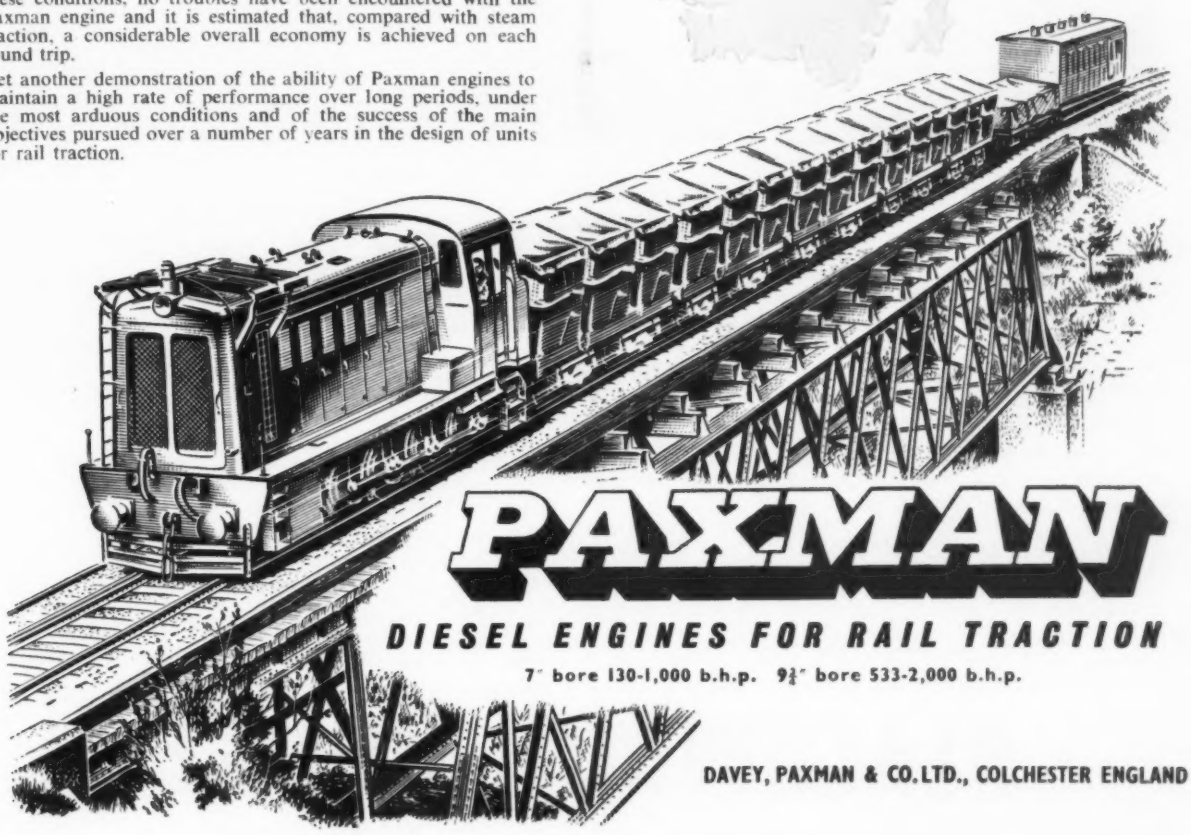

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The Mining Journal

London, February 14, 1958

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Can This Be Ignorance?

TWO particularly fine examples of the kind of misapprehension about tin, which so readily flourishes in the United States, have come to light in the past week. Their main interest lies in whether the reader feels able to ascribe them to ignorance or whether he will feel impelled to attribute some more sinister motive.

The first example concerns a recent comment in the *Journal of Commerce*, which, if correctly reported, was to the effect that the efforts of the Tin Council to stabilize prices might be frustrated because Malaya, under contracts already made, would have to exceed her export quota for the current period.

The fact is, of course, that figures of shipments from Malayan smelters bear no relation to export quotas. The former are a measure of actual despatch of refined tin from Malayan smelters to overseas destinations. The latter is an arbitrarily fixed point in the production process, at which tin output for export is measured. Annex C to the Tin Agreement sets out the " circumstances in which tin shall be deemed to have been exported ". These circumstances are somewhat different for each country. In the case of Malaya, the circumstances are stated to be as follows :

> " Tin shall be deemed to have been exported from the Federation of Malaya at the time at which the concentrates have or, where the concentrates have been smelted before the payment of export duty, the metal has been weighed by the Customs Department of the Federation of Malaya for the payment of such export duty."

It follows from this that all shipments from Malayan smelters during December, January and possibly also the first half of February, will represent shipments of tin mined prior to the introduction of the quota in mid-December. It also follows that total shipments during the period December 15 to March 31 will be very substantially in excess of the export quota for Malaya in that period. The same will be true of the other quota countries.

The need to soak up the large pipeline stocks when quotas were first imposed was, of course, clearly foreseen by the Tin Council, and this is why the initial quotas were so small. Had it not been for these pipeline stocks, a reduction of 40 per cent in output from the quota countries would, of course, have resulted in an immediate shortage. As things are, once equilibrium is reached and the buffer stock has been reduced to more manageable proportions, it is most unlikely that future quota cuts will be as large as they are at present.

In any event, it would be nonsense to suggest that the Malayan Government (which has not only made the largest single contribution to the buffer stock but is now the first country to announce its readiness to finance the additional special contribution recommended by the Tin Council at its last meeting), should sabotage its own efforts at stabilization by allowing producers to exceed their quotas. In fact, there is not the slightest risk of forward contracts being in excess of the permitted quota, but even if there were, the existence of the Tin Agreement would constitute a *force majeure* which could, and presumably would, be called in aid as justification for non-fulfilment of contract.

Another misapprehension which seems to be popular in New York at the moment is to the effect that because a brand of Russian tin has been registered as tenderable on the London Metal Exchange, this of itself constitutes a threat to the efforts at tin stabilization.

Figures so far available suggest that the impact of Russian exports on the tin market in 1957 was less than had been generally supposed. Certainly the mere fact of registering a brand name on the L.M.E. is not going to result in any more tin being exported from Russia, although it may mean that the exported tin will tend to come to the L.M.E. rather than be disposed of elsewhere.

The Tin Council stated recently that known Russian exports last year were between 8,000 and 9,000 tons. Exports in 1956 are believed to have been under 1,000 tons, while in previous years the Soviet *bloc* was usually a small net importer. While the Russians are now obviously a factor in the tin market, there is no indication that supplies from this source will increase further or even that the 1957 figures will be maintained. In fixing quotas the Tin Council naturally took account of the recent level of Russian exports, so that there is no cause for pointing to these as a threat to the future stability of the market.

From this sad recital, it would appear that the U.S. Government's expressed attitude of benevolent neutrality towards the Tin Agreement has found no echo in the private sector of the American economy. Certainly the persistent bear rumours which have been emanating from New York in recent weeks have done less than nothing to facilitate the operation of the Tin Agreement. They have, moreover, persisted despite the resolute action taken by the Tin Council at its last meeting, which makes it as certain as anything reasonably can be in our uncertain world that offerings of tin are going to fall substantially below the current level of consumption within the next few weeks.

In this context the American stock position must be a matter of some interest. U.S. imports and consumption of primary tin in 1957, although not yet finally known, appear likely to have been in approximate balance at around 56,000 tons. If so, year-end stocks may reasonably be assumed to have been little changed from the 20,000 tons at which the year opened, and which represents about 4 to 5 months' consumption. Shipments to the U.S. from Malaya during the last three months of 1957 totalled 4,835 tons, nearly half of which was despatched in October. This means that Malayan tin reaching American consumers during the first three months of this year will average 1,600 tons per month compared with a normal monthly average Malayan intake of 3,500 tons so that, in the absence of increased imports from other sources, stocks by the end of March might well be down to below 15,000 tons, that is to say, no better than three months' supply, which is the bare minimum for U.S. users. Substantial American buying this month for May delivery would thus seem to be almost inevitable. After the Chinese New Year they will, however, be lucky if they can buy more than 700 tons per week on the Singapore market, and may soon be paying £780 for tin they could have bought in recent weeks at £730.

THE PATTERN OF TIN DISTRIBUTION

The U.S.A. has also been in the tin news this week in connection with the accumulated stocks of Banka concentrates which have been piling up since Indonesia ceased shipments to Holland at the end of November. There has naturally been some speculation as to where these concentrates would eventually be sent, and it is now reported that the Wah Chang Corporation, which bought the Texas smelter from the American Government a year or so ago, is buying a portion of the Indonesian output.

No figures are at present available to indicate the scale of this trade, but in any event such a development would scarcely be surprising. Towards the end of the period when the Texas smelter was operating under government control, it used to take some 7,500 tons of Indonesian concentrates a year, as well as small tonnages from Thailand and the Congo, which were mixed with the lower-grade Bolivian ores. If the Texas smelter now intends to take Indonesian concentrates alone, the average grade will be 70 per cent tin or better, against an average of about 55 per cent when the smelter depended principally on Bolivian ores. Treating these higher-grade and less complex ores will render the smelting process intrinsically simpler and cheaper to operate and this, coupled with the probability that the smelter's more realistic capital structure, as reflected in the low purchase price which Wah Chang paid for it, probably means that the smelter is now in a position to compete economically with those in other parts of the world.

So far as Malayan producers are concerned, there seems no reason to regard this development with any alarm. Malayan metal shipments to the States have always been subject to wide fluctuations, and if the output from Arnhem is going to diminish greatly, Malayan tin will be required to fill the gap in those markets normally dependent on that source of supply.

SETBACK TO EIRE'S MINING HOPES

For the time being the bright promise of Eire's rapidly expanding mining industry has, to some extent, been overclouded by the slump in prices of non-ferrous metals.

Silvermines Lead and Zinc Co. Ltd., of Shallee, County Tipperary, with whom two U.S. firms were lately negotiating for mineral rights, have ceased production, the reasons given being the low world price of lead and the continued low grade of ore mined at Shallee.

Last November the Eire Minister for Industry and Commerce undertook to guarantee an extension of £60,000 to the existing trade loan. A commercial firm in Eire also agreed to advance £15,000 to the company by way of unsecured loan. In view of the decision to suspend production, the Silvermines Co. has agreed to limit its withdrawals from the trade loan to £36,500. This sum, together with £10,500 of the unsecured loan, will be used to carry out a programme of underground development and exploration at the mines as well as to care for the plant and machinery.

There are unconfirmed reports that the Abbeytown Mining Co. Ltd., of Ballisodare, County Sligo, might have to cease production at its lead and zinc mines in Abbeytown, where about 70 workers are employed. Although the deposits are by no means exhausted, mining has become uneconomic at the current prices for these metals.

On the other hand, production is going ahead at the Avoca copper mines, which now employs 450 workers, and there is said to be no question of reducing output. In the past two years the company has continued development work and two sample cargoes of raw ore have been shipped to the Continent for smelting. A concentrator now under construction is expected to be ready in the summer, the intention being to ship the concentrates through Arklow to the Continent for treatment. About 100,000 tons of raw ore is now awaiting treatment.

Saint Patrick Copper Mines Ltd., a subsidiary of the Mogul Mining Corporation of Toronto, was formed over two years ago to develop the copper mines at Avoca, which had previously been explored by an Eire Government company at a cost of more than £500,000. The Irish subsidiary was formed with a capital of £2,000,000, which

was underwritten by the parent body. The new company undertook to repay £500,000 to the Eire Government for the cost of the previous exploration work. Parliament is now being asked to approve the government's guarantee of borrowing by Saint Patrick to the extent of £1,368,420, under the State Guarantees Act 1954.

A progressive report by Can-Erin Mines Ltd., which operates deposits at Allihies, points out that the ore in this area lends itself to selective mining, thereby enabling the management to cope with downward fluctuations in the world price of copper. The report states that it is now within reason to anticipate 1,000,000 tons of recoverable ore around the Mountain Mine workings. This estimate does not take into account the probability that the ore shoots may extend well below levels worked by the former operators of these mines, or that parallel ore structures may be encountered. Investigations have shown that the former operators left considerable amounts of ore in the mines, which were not bottomed at 1,800 ft. The company's geologist has expressed the opinion that large tonnages would be proved in the exploration programme planned for the lower levels.

The Emerald Isle Mining Co. Ltd.—a Can-Erin subsidiary which operates the Allihies holdings—has been carrying out exploratory and development work in West Cork for the past 18 months, but so far no actual mining has been undertaken.

EXPLOITATION OF THE KOLAR GOLDFIELD

The Government of Mysore has approved a Rs.30,300,000 scheme for further exploitation, development and expansion of the Kolar gold mining undertakings under the second Five-Year Plan.

The scheme, which will be submitted to the Government of India and the Planning Commission, envisages the setting up of a crushing plant at an estimated cost of Rs.3,200,000 and a further provision of Rs.3,300,000 for the exploitation of the northern area of the Nundydroog mines.

The installation of a new shaft in place of the damaged Biddick shaft, is expected to cost Rs.2,000,000. Provision has also been made for further development of the Champion Reef mines at a cost of Rs.2,000,000.

The exploitation of the Mysore mines is expected to cost another Rs.2,600,000 with an additional provision of Rs.2,000,000. Rs.2,600,000 and Rs.3,000,000 have been provided for the development of the electrical department and for housing.

Prospects of reviving the extinct gold mining industry at Ramagiri in Anantapur district and in the Chittoor district in Andhra State are being investigated by the government with the aid of modern geophysical methods and drilling.

Preliminary mapping of these areas is now being carried out by the Geological Survey of India. A very promising indication of gold-bearing veins has been discovered in the Palmaner area of Chittoor district, where an extension of the Kolar Gold Field has been traced.

A "BUYERS' MARKET" FOR COAL

A few short years ago the prospect of a coal surplus in Britain seemed so remote that it did not warrant consideration and in the first decade of nationalization a chronic fuel shortage precipitated an intensive mechanization programme. Coal at any price and in any condition found a ready market.

Recently, the Minister of Power announced in the House of Lords that a "turning point" has been reached in fuel and power problems—a turning point brought forward by the advent of nuclear power. In the face of competition from nuclear power and increasing imports of fuel oil into Western Europe, it appears that the European coal industries will have to learn the forgotten art of selling coal in a buyers' market. Already the British National Coal Board is beginning to consider ways of curtailing marginal production, for with some £24,000,000 of capital locked up in currently unsaleable stocks of small coal, an embarrassing situation has arisen.

Unfortunately, many of the marginal and uneconomic mines are anthracite and coking coal producers—grades which are in heavy demand. The Board's main problem is that the grades which are proving most difficult to sell are in the main produced from relatively modern and well-equipped pits. Here the culprit is power-loading. Over 40,000,000 tons of coal are now power-loaded each year and some of the machines in use are notorious for the smallness of product. Unfortunately, with some of today's mining machines, it seems that size of product is inversely proportional to rate of production.

A more selective approach to power-loading is essential and although the Board is committed to some extent by large-scale contracts placed previously with the manufacturers of mining machinery, there must be no future indiscriminate introduction of loading machinery. Any slackening in the demand for loading equipment will no doubt be unwelcome to British manufacturers who have grown used to full order books. However, a slackening in home demand could well stimulate interest in overseas markets and also act as a spur to the development of better machines.

It is, of course, obvious that coal must remain an essential basis of U.K. fuel resources for many years to come. These resources must, however, be expoited to their best advantage.

HISTORY BY AIR

As a result of some aerial geophysical prospecting carried out in Cornwall last summer by the Geological Survey in conjunction with the A.E.A., certain areas have been selected for further examination.

One area is near Ponsanooth, near Falmouth, on the site of the Roscrow United Mines, where some further examination is now being made. This mine, also called South Tresavean, is known to have yielded some silver, copper, uranium and nickel in a pyritic lode. However, records are scanty. In 1870 the mine was 40 fathoms deep and employed 12 men, whilst around the early part of this century, water from the mine was bottled and sold for its medicinal qualities. Indeed, it was listed in earlier editions of the *Extra Pharmacopoeia* and was stated to contain permanent activity due to dissolved radium.

Later again, about 25 years ago, interest was taken in the property, when samples of the mine water were again found to be radioactive, but the project for examining the mine did not materialize.

Also of interest is the identification of a rare mineral known as coffinite in ore samples from Roscrow United Mines, as reported in *Nature*, by K. Taylor and R. K. Harrison, of the Atomic Energy Division of the Geological Survey of Great Britain. Hitherto, coffinite, which contains uranium, has been found only in the Colorado Plateau, U.S., and in South Island, New Zealand.

Research at the Royal School of Mines

The Royal School of Mines, Imperial College of Science and Technology, is helping to meet the unprecedented demands from industry for minerals and metals, not only by training students in the various techniques of mineral exploration, mining, mineral dressing and metallurgy, but also by carrying out research aimed at providing better methods of prospecting for ores, of unearthing them, and of extracting and treating their metals. The principal researches undertaken during the past three years are summarized in the research report of the Royal School of Mines, 1954-57. Since 1954, when the first triennial research report was issued, new chairs have been established in applied geophysics and physical metallurgy, and a top storey has been added to the Royal School of Mines to accommodate the sub-departments of geochemistry and applied geophysics.

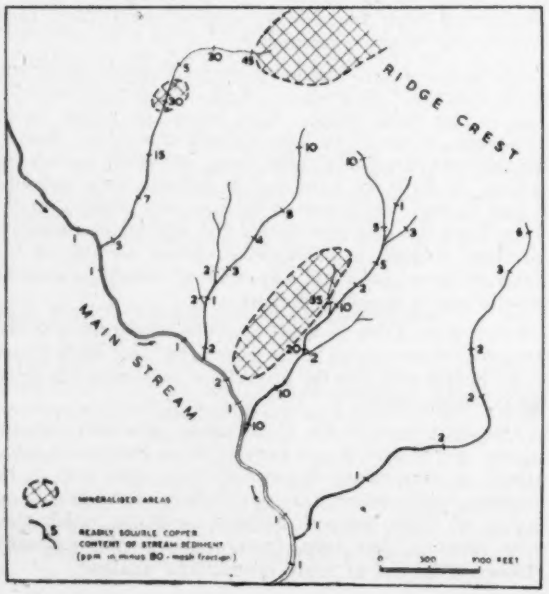
RESEARCH related to the recovery and refining of metals is prosecuted by the Nuffield Research Group in Extraction Metallurgy. This was started in 1950 with a grant from the Nuffield Foundation, but today its funds come mainly from the metallurgical industries in Britain and the Commonwealth.

The group's researches have so far been directed towards establishing the physical chemistry underlying pyrometallurgical processes at temperatures up to 2,000 deg. C. The twenty current projects are divided between the thermodynamic and kinetic properties of molten metals and alloys, molten silicates and halides, solid oxides, sulphides and sulphates, and volatile metal compounds. There is a strong emphasis on work related to the winning of the newer metals and especially those important for the production of atomic energy.

With the aid of a special grant from the D.S.I.R., a programme of research is now being started to develop techniques for making equilibrium studies at high pressures at temperatures up to 2,000 deg. C. and at normal pressures in the range 2,000 - 3,000 deg. C. This work is being attempted not only on account of its scientific interest, but also to meet the industrial need for knowledge of the behaviour of metallurgical systems under these extreme conditions.

Analytical Research

Accuracy in analysis is largely dependent on the selectivity of the reagents used. When a metal forms a complex with an organic reagent a high degree of selectivity can often be obtained by the use of organic solvents, and a systematic examination of the properties of organo-metallic complexes in organic solvents is being made in the analytical section. Of special interest is the extraction, for example, of metal 8-hydroxyquinolates and derivatives with immiscible organic solvents, and the separation of the complexes on selectively adsorbing materials such as activated alumina. Out of this work has arisen a new method for the spectrophotometric determination of chromium and copper, in which either their 8-hydroxyquinolates, or better, their " 8-hydroxyquinaldates ", are dissolved in chloroform-benzene mixture and the solutions are passed through an activated alumina column, the complexes of chromium and copper being selectively extracted, free from other metal complexes, on elutriation with suitable organic solvents.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MINERALISED AREAS
READILY SOLUBLE COPPER CONTENT OF STREAM SEDIMENT (p.p.m. in minus 80 - mesh fraction)
0 500 1000 FEET

Dispersion of copper in stream sediments during copper mineralization, Uganda. Systematic stream sediment sampling at 500 ft. to 1,000 ft. intervals promises to aid in the detection of sizeable deposits. Illustrations are by courtesy of the Imperial College of Science and Technology

" Vanadium (V) 8-hydroxyquinolate " has caused some interference with these analytical methods, the main difficulty arising from its reaction with the traces of ethanol preservative in chloroform. This reaction has been exhaustively investigated, with the result that a characteristic test for alcohols, thiols and amines has been developed, and the known chemistry of vanadium has been extended.

Preliminary work has been carried out on interferences in the iodimetric determination of tin and ores, and the low temperature decomposition with chlorine of certain minerals, those of niobium; this work may have application in fields wider than those of analysis.

Mineral Dressing

Among the ores tested have been those of a borate from Turkey, lead-zinc sulphide from Northumberland, kyanite from Kenya and iron from Norway. Losses in the cyanide treatment of West Rand gold ores from newly-developed mines have also been investigated.

The development of a process for concentrating an iron-phosphorous niobium ore from Uganda was completed and a 100-ton a day pilot plant has now been put into operation in Uganda.

A good example of how an investigation develops from a technical plant problem into a laboratory investigation in pure science is afforded by present research into the solubilities of some copper salts. This was started in September, 1954, as the result of an enquiry into the possibility of recovering copper from the slimes portion of a Rhodesian ore. The results of this work to date suggest that chemical reactions may play an important part in flotation, and the possibility of a connection between the amount of copper dissolved and the ease of flotation is being studied. Evidence has also been obtained which suggests that a stoicheiometric reaction takes place between the mineral and the collector. In order to examine these points further, pure minerals made in the Chemistry Department of the Royal College of Science are being used.

Except in a very few cases, if a mineral particle is to adhere to an air bubble and so be removed in the froth during a flotation operation, it must be coated with a suitable reagent. Since the forces between the adsorbed reagent and the mineral are often chemical in nature, it should be possible to correlate the flotation behaviour of a chemical compound with the way it reacts with the metal in solution. Conversely, knowing the way a particular type of compound behaves with a metal in solution, it should be possible to predict the usefulness of analogous materials as flotation reagents for the metal. These problems have been studied from a fundamental viewpoint and some success has already been achieved. The most useful materials are insoluble in water; hence it has been necessary to develop methods for studying the chemical systems in inert organic solvents.

If water-insoluble reagents are to be employed in mineral dressing practice, they must be used in a suitable solvent. It is necessary, therefore, to know how liquid reagents can best be applied to the suspension of ore in water. This problem also occurs in the treatment of fine coal by flotation, where fuel oil, with or without additives, is the reagent. Much has yet to be learned about the way in which the oil interacts with the coal, and the concepts of chemical kinetics are being applied to study the fundamental aspects of the processes involved. Results obtained so far suggest that it may be possible to achieve substantial savings of oil in flotation plants by adopting a simple method of application now being studied in detail.

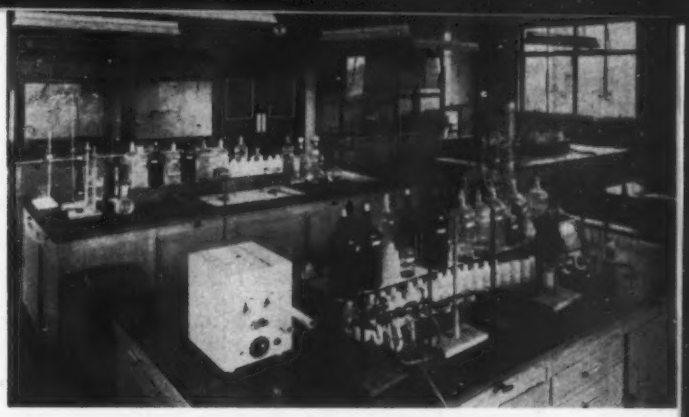
The technique of thin-section microradiology, outlined in the report for 1950-53, has been successfully applied to the study of an increasing variety of ores and mill products. Among such applications is the rapid assessment of the grade of cassiterite concentrates during test work, thus avoiding tedious chemical assaying.

Considerable progress has also been made in developing specialized mineralogical techniques simple enough to be applied to routine control and testing in industrial operations. A standard procedure of such routine methods for the industry is now in preparation.

The work on pulp density measurements described in the last research report has been completed; it now seems unlikely that high-frequency sound vibrations can be used to achieve significant improvements in mineral dressing processes. It was discovered, however, that measurement of the amount of sound lost by scattering when the vibrations pass through a suspension of solid particles in water can give a measure of the proportion of solid present, or " pulp density ".

Investigations have recently started on the fundamental principles of heavy-media separations in cylones, working at high densities. The possibilities are being studied of extending this type of heavy-media treatment into fine range sizes which abut or overlap those of flotation.

Pressure-leaching methods for dissolving desired constituents from ore are becoming increasingly important. Work in the department has been concentrated on minerals that are difficult to open up by conventional methods and where subsequent purification procedures are complicated. The mineral dressing operation in such cases consists in taking material which is difficult to react and changing it into a more amenable compound. A method for treating zircon to derive a form of zirconium oxide, which is free-flowing and readily soluble in acids, has been fully worked out and appropriate pressure equipment for a pilot plant is being designed by an interested company. Work on chromite has shown that water-soluble chromium salts can be produced quite readily by pressure-leaching, good grade iron oxide being a useful by-product. Promising results have been obtained with minerals containing beryllium, niobium, tantalum, thorium and the rare earths. Work on these is proceeding as rapidly as possible with the support of the National Research Development Corporation.



The new main geochemistry laboratory

Research has continued on modern techniques of surveying and on the development of electrical computers for determining the stresses in structural frameworks. In addition, several problems of interest to mining engineers have been analyzed and work has begun on them in recently-completed accommodation in the Bessemer Laboratory.

One of the difficulties encountered in deep mining is the reduction of temperature to a value which ensures reasonable working conditions. There are serious objections to the use of upcast air as a heat carrier, and, if underground refrigerators are used with cooling water circulated from the surface, excessive hydrostatic pressures are produced, unless the total head is subdivided by a complicated system of pumps and hydraulic turbines.

The possibility of disposing of the rejected heat in latent form by flashing a proportion of the condenser water into steam in a closed vessel, placed in communication with a second condenser on the surface through a pipe in the shaft, is being examined in detail. Consideration is also being given to the use of compressed air instead of electricity to drive underground refrigerators in order to derive the benefit of the additional cooling effect produced by the expansion of air in the motors.

Mining Geology

The work of the Royal School of Mines in geochemistry and applied geophysics was reviewed in an article describing the accommodation provided for these sub-departments in the new top story of the building (*The Mining Journal*, June 15, 1956, p. 743).

Notable advances continue to be made by the Department of Mining Geology in the realms of geophysical exploration. Work has been carried out in a number of areas in Africa, including the Rhodesias, Uganda, Tanganyika, Bechuanaland and Sierra Leone, as well as in the U.K. These studies have been concerned mainly with prospecting methods for copper-cobalt, nickel, arsenic-antimony (gold), tungsten, molybdenum, chromium, lead and zinc. The results of these and analogous investigations have been so successful that geochemical methods of exploration are now being used by mining companies on an increasing scale in many parts of the world.

In addition to work on field problems, research has been undertaken on analytical aspects in collaboration with the Inorganic Chemistry Department of the Royal School of Science. This work has resulted in new and improved field tests for a number of trace metals. The development of automatic analysis is also receiving attention.

Detailed investigations have been carried out on a wide variety of mineral deposits in an endeavour to discern their mode of origin, the structural controls of ore localization, and the paragenesis of the ore constituents.

ALUMINIUM—II

The Future of Australian Alumina

By

J. A. DUNN

The early development of the bauxite deposits of Queensland and Northern Territory will be by the production of alumina. To what extent is it likely that Australian alumina production can find a place in world alumina trade, up to the time when aluminium reduction on a large scale can also be developed in Australia? The following article, the second of three instalments, condensed from *The Australian Mineral Industry Quarterly Review*, attempts to answer this question. The author is chief mineral economist, Bureau of Mineral Resources, Geology and Geophysics, Australian Department of National Development. All tonnages quoted are in l.tons.

IT may be assumed that countries within the Soviet sphere have adequate indigenous bauxite and other alumina-bearing resources. If it is assumed that the projected capacity in 1965 in Free World countries will be fully utilized, then alumina requirements will be roughly as under:

FREE WORLD ALUMINA REQUIREMENTS FOR ALUMINIUM REDUCTION
(l.tons)

	1956	1965 *Based on capacity*
U.S.	3,000,000	4,800,000 - 4,900,000
Canada	1,100,000	2,000,000 - 2,160,000
South America	22,000	24,000 - 100,000
Europe	1,300,000	1,600,000 - 1,900,000
Africa	—	200,000 - 400,000 +
Asia	160,000	320,000
Australia	18,000	28,000

India, Japan and Formosa will be showing an increase; alumina will also be produced in Sumatra for an adjacent reduction plant. India and Indonesia will be fully self-contained not only as to bauxite but also as to alumina plant capacity. Formosa has adequate and Japan excess alumina capacity (160,000 tons), but will continue to import bauxite from Malaya and Indonesia.

With construction of the 480,000 tons alumina plant at Fria, in French Guinea, there is likely to be around 400,000 tons of alumina available in excess of requirements at Alucam's plant at Edea, Cameroons, until such time as other reductions plants in West Africa are constructed. This excess is likely to be absorbed by associated companies in Europe, and perhaps one associated company in the United States; British Aluminium Ltd. is said to have a 10 per cent investment in this plant at Fria, and will be taking 10 per cent of the production as its contribution to the supply of alumina for the reduction works at Baie Comeau, Canada, mentioned later. The production from the proposed 220,000-ton Boke alumina plant (French Guinea) will presumably be absorbed initially by the associated Canadian company in Canadian reduction plants.

NORTH AMERICAN PRIMARY ALUMINIUM CAPACITY

	end 1957/early 1958		*Including under construction or projected*	
	No. Plants	*Capacity l.tons*	*No. Plants*	*Capacity l.tons*
U.S.A.:				
Aluminium Co. America (Alcoa)	8	725,000	8	859,000
Reynolds Metal Co.	6	536,000	7	725,000*
Kaiser Aluminium and Chemical Co.	4	476,500	4	609,000
Anaconda Aluminium Co.	1	54,000	1	54,000
Ormet Corp.	1	160,000	1	160,000
Harvey Aluminium Co.	1	60,000	1	60,000
TOTAL U.S.	21	2,011,500	22	2,458,000
Canada:				
Aluminium Co. Canada (Alcan)	5	680,000	6	920,000
Can. Brit. Alum. Ltd.	1	40,000	1	160,000
TOTAL Canada	6	720,000	7	1,080,000

* Includes possible further capacity at Massena, N.Y.

The North American Consumers

There may be some market for Australian alumina in Europe, but it would seem to be relatively small and likely to be represented, if at all, by requirements of British Aluminium Ltd., which is arranging a share in an Australian company. The projected market for Australian alumina would seem to be mainly confined to North America where alumina requirements by 1965 could be nearly 3,000,000 tons greater than in 1956, assuming the world aluminium consumption requires that all projected aluminium reduction capacity be utilized. It is of interest, therefore, to examine some data of North American companies. The table below (left) lists the aluminium reduction capacities of the various companies.

UNITED STATES ALUMINA PLANT CAPACITIES
(l.tons)

Operating end of 1957:	
Alcoa—Bauxite, Arkansas	358,000
Mobile, Alabama	782,000
Reynolds—Hurricane Creek, Arkansas	652,000
Sherwin, Corpus Christi, Texas	489,000
Kaiser—Baton Rouge, La.	714,000
Gramercy, La.	384,000
Additional early 1958:	
Alcoa—Point Comfort, Texas	670,000
Ormet—Burnside, La.	312,000
	4,361,000

In the United States, of the plants available in 1957/58, seven are close to the west coast, in Washington and Oregon

States, and the remaining fourteen are scattered over the country. An additional new plant is under construction in New York State. It is of interest to note that three recent plants are based on thermal power from coal. Of the Canadian plants five are in Quebec (one to begin production at the end of 1957) and one at Kitimat, in British Columbia; another projected plant will be in Quebec. Some plants under expansion or construction in North America have been slowed down, or in part deferred, because of the present world excess capacity.

Of the projected new capacity included in the table, additional capacity under actual construction will bring the U.S. total capacity to 2,192,700 tons, and the Canadian capacity to 814,000 tons by mid-1959. No starting date is fixed for the remaining increase in the United States, which will be by adding further potlines to the then existing plants—eventual U.S. capacity may be about 2,458,000 tons. Also, in Canada, further additions will be a new plant of 107,000-ton capacity, and other potlines to then existing plants—eventual capacity will be about 1,080,000 tons. More distant expansion at Kitimat will bring the total Canadian capacity to about 1,280,000 tons of aluminium.

U.S. Alumina Plant Capacity

Alumina plant capacity in the United States, annually, is as listed. A 300,000 tons Alcoa plant, East St. Louis, Illinois, ceased production of alumina in late 1957, and its place will be taken by the Point Comfort plant. The Arkansas plants use local ores, with some imported ore at Hurricane Creek. The Gulf ports, in Alabama, Texas, and including the Louisiana plants near the mouth of the Mississippi, are well situated to treat ores imported from associated or subsidiary companies in Jamaica, Dominican Republic, Surinam, British Guiana or even West Africa. These plants provide (or will provide) alumina to the respective companies' works in various parts of the United States.

It will be noted that of the U.S. metal reduction companies, two have no associated alumina plants. The Anaconda reduction plant in Montana (until recently supplied by Reynolds) now obtains its alumina supplies from Kaiser, but is doing pilot plant research on using local clays. The reduction plant of Harvey Aluminium Ltd., in Oregon, about to commence production, will need to purchase alumina for the present from Japan; the company is to prospect for bauxite in Jamaica.

With plant now under construction by Alcoa and Ormet, U.S. alumina capacity will be about 4,361,000 tons. The projected aluminium reduction capacity in U.S.A., by 1965, about 2,458,000 tons, if fully used, will require around 5,000,000 tons of alumina. Part of this additional alumina will come from associated or subsidiary companies oversea—some plants and agreements have already been made in the Caribbean region.

A Future Market?

It is of interest to note that several North American companies have expressed an interest in the Australian bauxite deposits. U.S. aluminium companies tend to obtain their oversea requirements from associated or subsidiary companies, so that a large U.S. market for Australian alumina is likely to be more assured if U.S. companies acquired some financial interest in Australian production.

In Canada, Alcan's aluminium reduction plant at Kitimat, British Columbia, and others in Quebec, are all close to tidal water. An alumina plant at Port Alfred, Quebec, supplies the Quebec requirements and treats bauxite from associated companies in British Guiana, and French West Africa, and some from Surinam. Alumina for the Kitimat plant is imported from an associated company, Alumina Jamaica Ltd. (a subsidiary of Aluminium Ltd.) in Jamaica, which has a capacity of 490,000 tons alumina a year; some is also available from Japan (from Malayan bauxite). Aluminium Ltd. proposes to construct a second plant, of 220,000 tons alumina capacity, in Jamaica.

At Baie Comeau, Quebec, the Canadian British Aluminium Co. (parent company, British Aluminium Ltd., in conjunction with Alcan) are constructing a reduction plant in stages, the first stage to come into operation at the end of 1957. The first two stages will require about 160,000 tons of alumina, and the final two stages to be completed by 1965, a further 160,000 tons. Apparently until 1977, 75 per cent of the alumina for this plant is to be supplied by Alcan. It has been stated that the parent company, British Aluminium Ltd. (which is expected to have an interest in Commonwealth Aluminium Corporation), will apparently supply its share of alumina eventually from the Fria plant, French Guinea, in which it has an investment.

The projected new reduction plant by Alcan, along the Saquenay River, Quebec, will also require 214,000 tons of alumina, whilst the largest expansion by Alcan, at Kitimat, British Columbia, will require a further 270,000 tons of alumina as planned to date, and yet a further 400,000 tons when the power capacity is eventually doubled. It is interesting to note that Aluminium Laboratories Ltd., an associated company of Alcan, is vigorously prospecting in Queensland and Northern Territory.

The additional presently planned requirement in Canada totals some 800,000 tons of alumina, which will be raised to about 1,200,000 tons by the later stage of expansion at Kitimat. A small part of this will be supplied by British Aluminium Ltd., presumably from West Africa. The bulk will be supplied by associates of Alcan, from Jamaica and West Africa—some share in this market may come to Australia should the present prospecting efforts here of Alcan's associate, Aluminium Laboratories Ltd., lead to mining.

Market Simultaneous With Production

It is apparent from the above outline that by the time large-scale alumina production can commence in Australia at some date in the early 1960's, there will be a large market for alumina in North America from oversea sources. With alumina available in Australia, on the western side of the Pacific, it may well prove that a re-alignment of the alumina trade in North America may take place. For the present, alumina from Jamaica supplies the Kitimat aluminium plant, and alumina plants in the U.S. Southern States supply reduction plants in Washington and Oregon; a market is also available in this region for some alumina from Japan. Australian alumina may eventually find its more natural market on the western coast of America.

Alumina requirements for presently planned reduction capacities on the western coast of North America total 1,750,000 tons; about 600,000 tons annually at Kitimat, and 1,150,000 tons in Washington and Oregon States (Alcoa 370,000 tons, Reynolds 270,000 tons, Kaiser 380,000 tons, and Harvey 130,000 tons). The total will rise to over 2,000,000 tons when the final phase of the Kitimat plant is undertaken. Having in mind Panama Canal dues, Australian alumina may well prove competitive with Caribbean alumina in supplying part of this market. Relevant factors are costs of transport, power, and raw materials—in Australia, the present market price of soda ash, the principal reagent in treatment, is double that of other countries, and may, therefore, be a very important item if the bauxite is high in reactive silica.

Exploration in Canada

AN old-fashioned gold rush into the Eastern Townships of Quebec has signalled the commencement of what mining men think will be one of the most active periods of exploration in Canada's history, writes our correspondent in the Dominion.

The Chaudiere River gold rush was sparked by M. J. Boylen, of Toronto, who a few years ago was responsible for the discovery and development of the new base-metal fields of New Brunswick. At the latest count some 100,000 acres have been staked or optioned. Preliminary investigations have been proceeding for over a year and accumulation of ground has been carried out quietly by Mr. Boylen and his associated companies. So far no other large companies are reported as having filed claims. The area is one of the oldest mining districts in Canada, recovery of placer gold having been carried on intermittently between 1847 and 1912 and it is reported that between $2,000,000 and $3,000,000 were recovered in minor operations. A large-scale placer operation using dredges is foreseen.

This activity has directed attention to the many other areas where plans for 1958 include energetic investigations of promising showings. In north-eastern Saskatchewan, scene of active staking over the past few years, several prospects have been singled out for drilling. In northern Manitoba, the recent development of the Mystery-Moak Lakes nickel deposits by Inco has stimulated interest in adjacent showings. In northern and north-western Ontario scattered prospects are attracting attention. In north-western Quebec the recent discovery of huge iron deposits near Whale River, on the east shore of Hudson Bay, has stirred widespread interest. Only in B.C., due to recent adverse legislation, is activity slackening.

Saskatchewan and Manitoba

A copper-zinc prospect near Brabant Lake in Saskatchewan is due for intensive development. Westore Mines Ltd., holding land jointly with Paramount Petroleums and Minerals, reports it has already outlined about 1,500,000 tons of ore averaging 4.8 per cent zinc, 0.55 per cent copper plus some silver values to a 300-ft. depth. A deep-drilling programme is to be undertaken immediately.

The La Ronge area, which has promised much, but so far yielded little, is due for increased exploration with Rio Tinto interests leading the way. Rio Canadian Exploration Ltd. will attempt to prove sulphide orebodies so that the fairly substantial deposit of Anglo-Rouyn Mines, Ltd., can be developed. By itself this is not believed to be economic in this location.

In the north-east area of the province, where the exploration pace has been brisk recently, a number of prospects are active. Mansa Explorations Ltd. has plans for drilling a base-metals prospect west of Flin Flon near Piney Lake where surveys have indicated good anomalies.

Another programme is being lined up by Hanson Lake Mines, successor to the Parrex Syndicate. The company has holdings which stretch in a 175-mile belt across the Manitoba-Saskatchewan border but chief interest is in the Hanson Lake group, 40 miles north-west of Flin Flon. Major mining companies, which have an interest in Hanson Lake Mines, are backing the deal and include Noranda, Teck Hughes, New Dickenson, Crowpat and Consolidated Goldfields.

Rio Canadian, which is ranging wide in its mine-finding programme, has gathered together a large number of claims at Wintering Lake, 40 miles south of the much-publicized Mystery Lake nickel deposits. A number of anomalies, indicated by air survey, are to be drilled this year.

In the Herb Lake area which has been prominent in recent months for the variety of minerals indicated, Texas Gulf Sulphur and Selco Explorations intend to proceed with the development of copper prospects picked up from Jay Kay Syndicate.

Ontario

Rio Canadian Explorations is drilling a molybdenite prospect in the Sioux Lookout area.

In the Savant Lake area of north-western Ontario, Northern Canada Mines will examine the potentialities further and may announce a drilling programme soon.

The recent strength in gold stocks, caused partly by deflationary trends in the Canadian economy, has renewed interest in gold areas and one of the most active at the present time is the Red Lake district. Operating companies, including Madsen and New Dickenson, are coming up with better grades and exploration work in the vicinity is stimulated as a result, with a number of companies pushing development plans.

In the Mine Centre district of north-western Ontario, Noranda is carrying out geophysical work and trenching on a copper prospect.

Several companies have been working in the Mattagami Lake area and indications are that 1958 plans have been completed and activity is due to start again. The Mattagami Lake Syndicate, which paced exploration in the district last year, is returning for a further investigation of its holdings. Newmont Mining Corp. is back to do survey work and Kennco Explorations plans deep drilling within a few weeks. East Sullivan Mines is already on the ground with a programme of ground work and deep drilling with activity being centred on the Cavalier block, south-west of the Mattagami Syndicate holdings. Also with plans for this district are Ajax Petroleums, reported to be moving in drilling equipment, New Hosco and Norvalie Mines, Ltd.

Quebec

Many of the highlights in mining news of recent years have been provided by the Province of Quebec and it appears that 1958 will be no exception.

Already announced is the discovery of a huge deposit of magnetite on the east shore of Hudson Bay. This will be subject to intensive exploration this year. The find is owned jointly by Belcher Mining Corporation, Wright-Hargreaves and Malartic Gold Fields and a new company, Great Whale Iron Mines Ltd., has been formed to develop the orebody. The deposit is of major proportions—1,900 ft. wide and five miles long with first calculations suggesting something like 2,500,000 tons a vertical foot of 40 per cent iron.

In the LaMotte township of the province a nickel discovery has stimulated interest and two companies, Marchant Mining Co. and New Hosco, are reported interested in further development.

British capital is financing exploration in the Noranda area, with Consolidated Zinc Corporation of Canada drilling an optioned copper property of Consolidated Vauze and another prospect optioned from MacDonald Mines, Ltd.

General Electric In 1957

IN keeping with its traditions, The General Electric Co., Ltd., in 1957 maintained its service to industry, many of its products being produced specifically for mining service, both in the United Kingdom and abroad.

Among the winding engines installed overseas during the past twelve months are two interesting machines in Australia—one at Cessnock Colliery, New South Wales, and the other at Mount Isa Mines. The Cessnock winder has a single drum, 14 ft. dia. by 10 ft. 6 in. wide, directly driven by a 1,450 h.p. d.c. motor, and is designed for a coal-raising duty of 7,616 lb. from a depth of 1,270 ft. The drum has cast-iron cheeks and the drum shell is of welded construction. The shell stiffeners are completely welded to the shellplate and the whole is normalized before final machining.

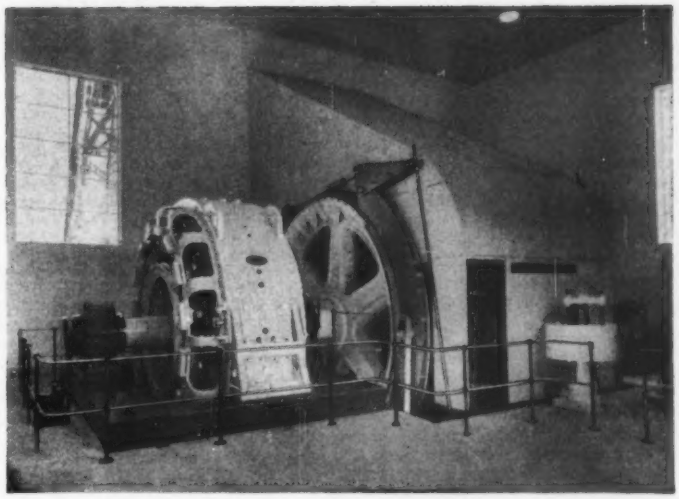
The Mount Isa Mines winder is the largest electric winder ever to be installed at an Australian mine. It is a 16 ft. dia. by 6 ft. double-drum double-clutched winder driven through single reduction gearing by two 2,250 h.p. d.c. motors, and is designed to deliver 180,000 tons of ore from mine to mill each 28-day period, this being an increase of almost 80,000 tons over the present shaft capacity. Automatic push-button control from twelve levels is a feature of this installation.

A four-rope Koepe winder, one of the largest of its type, was installed during 1957 at West Driefontein, near Johannesburg. With the exception of the gears, the mechanical parts were made by the East Rand Engineering Co., Ltd., from drawings and design data supplied by Fraser and Chalmers. It is capable of raising a skip load of 14 s.tons from a depth of 5,460 ft. All the electrical equipment was made at Witton; it includes two 2,050 h.p. d.c. motors and a 3,800 h.p. Ward Leonard set operating in conjunction with control exciters. Notable features of the control gear supplied by Witton include provision for push-button control by the onsetter at the bank, in addition to normal hand control by the winding driver, and also the use of geared potentiometers and induction regulators.

Materials Handling

For the Indian Government's new steelworks at Durgapur, near Calcutta, the materials-handling department of the Fraser and Chalmers Engineering Works has received orders comprising the complete ore handling and blending plant, which is designed for dealing with limestone, dolomite, and miscellaneous materials. The plant includes three wagon tipplers, each of 40 tons gross capacity, for discharging the ore and limestone to the conveyor system, which is some four miles in length; while the ore blending section comprises two stackers and two Robins Messiter reclaiming machines.

In addition to this plant, further orders are in hand for three stackers and three similar blending machines, together with two further wagon tipplers for the coal blending section, providing coking coal for the blast furnaces.



The 1,450 h.p. D.C. winder at Cessnock Colliery, New South Wales

The installation of three electrolytic tinning lines at the Velindre works of the Steel Co. of Wales, Ltd., represents a very substantial increase in the tinplate manufacturing capacity of this country. All the electrical driving equipment for these lines, the first of their type to be made in Great Britain, was supplied by the G.E.C.

Ore handling and blending plant supplied by the Company's Erith works is now in operation at the Aviles Steelworks in North Spain. The first of the new type Robins Messiter reclaiming machines, recently developed at Erith, is now being erected at the Ilva Steelworks, Piombino, Italy.

Metallurgical Furnaces

Furnaces for metallurgical applications and using vacuum techniques are prominent in the year's progress. One example is a new design of continuous 65 kW. pusher furnace for pre-sintering tungsten carbide tool tips which has been supplied to Firth Brown Tools, Ltd. The single unit is encased in polished stainless steel sheet and reaches temperatures up to 1,000 deg. C.

Increasing interest in vacuum treatment has led to the design and installation of more vacuum furnaces. Their sizes and ratings are now being standardized. Standard furnaces will include a laboratory unit and the smaller types of production units. The former will be quite compact, having working dimensions 3 in. in dia. and 6 in. in height. The latter are intended for applications such as silver soldering, brazing of heat-resisting alloy compacts and cermets. These furnaces can also be used for small-scale annealing of titanium and zirconium. The larger types of furnaces for production work, not yet included in the standard ranges, will continue to be supplied as required.

The expansion of facilities for higher technological education requires that technical colleges and universities should provide suitable modern equipment for the training of metallurgists. One useful piece of equipment is a high-frequency installation. A generator with an output of 25 kW. has been installed at Nottingham University, and a smaller unit of 7 kW. output, complete with a melting furnace table, has been supplied to King's College, London. A recent development in high-frequency heating is the use of a flexible cable to take the output from the set to the work position or to a hand-held coil.

The range of modern high-frequency generators has been extended by the introduction of an 8 kW. dielectric heater and an 18 kW. induction heater.

Nuclear Power

Work in connection with nuclear power has included the study of the properties of slurries or suspensions of thorium and uranium compounds in liquid metals for use in breeder reactors. Other investigations have been directed to the penetration of liquid sodium into graphite and the effect of neutron irradiation on the mechanical properties of graphite.

In parallel with the development of the present type of nuclear power station, work is now being carried out on a new project, the high-temperature gas-cooled reactor. The Company has been awarded a contract by the United Kingdom Atomic Energy Authority for a large part of the design and construction of a zero-energy assembly for this reactor, which will be used primarily for the investigation of the nuclear properties of the design without the complications of high heat output and radiation intensity. The basic fuel is thorium.

Finally, it is reported that amongst the products manufactured by G.E.C. during 1957, an addition to the range of line-trap coils for use in conjunction with telemetering equipment on high-voltage lines is a 2,000 A coil developed to fulfil an order from the Aluminum Co. of Canada for the Kitimat-Kemano project. This line-trap is the largest in the range, which now comprises coils rated at 400, 600, 800, 1,200, 1,600 and 2,000 A, all with an inductance of 200 microhenries.

MINING MISCELLANY

Chromite ore from the Red Mountain district of the Kenai Peninsula, Alaska, can be upgraded by simple methods to yield concentrates eligible for Government purchase, states a U.S. Bureau of Mines technical report.

★

The Turkish Ministry of Industry has requested all organizations concerned with the exploitation of the country's mineral resources to submit to the Chrome Producers' Committee by the end of this month a list of all the machinery and equipment they need.

★

Coldstream Copper Mines has suspended operations on Burchell Lake, in the Shebandowan-Kasabowie area of Canada, having been seriously affected by the copper price cuts, particularly in recent weeks.

★

The Wankie Colliery Co. is reported to be trying to capture new markets in the Congo and other African territories. The aim is to make the best use of railway trucks becoming available on the Northern Rhodesia line, because of the current copper slump. The reduction in the Copperbelt's coal demand will not be enough, however, to allow the colliery to increase substantially exports northwards or overseas via Lourenco Marques.

★

A mining company will shortly be formed to work the rich iron-ore deposits of Mekambo, in Gaboon, French Equatorial Africa, which are estimated at over 200,000,000 tons, with an iron content as high as 63 per cent American, French, Italian, German, Dutch and Belgian interests are likely to be represented. The main backer of the project, Bethlehem Steel, will hold 50 per cent of the capital. The new company will replace a study group which has been prospecting the deposits. The main obstacle facing the working of the Mekambo deposits is transport. Mekambo lies nearly 600 kms. from the coast and it is roughly estimated that an investment of 120,000,000,000 frs. would be necessary to exploit the deposits and build a railway to carry the ore to the sea.

★

A widespread geological survey for new mineral deposits in six areas of Hungary is to be carried out by the Hungarian Geological Institute. In the Mecsek mountains, southern Hungary, geologists are investigating hard coal deposits with a view to sinking more shafts. At Tokay, in the north-east, mineral deposits previously thought to be of little practical value are being re-examined. Investigations in the region of Matra, northern Hungary, which have already led to the commercial development of non-ferrous metal deposits, will be continued. A search for manganese will be undertaken in the Bakony Mountains. In the Dorog coal basin, geologists will investigate the possibilities of sinking additional pits without danger from underground water. In the Bükk mountains the survey will aim at enlarging the Borsod coal-mining area.

★

The purchase of the Consolidated Coppermines Corporation mining properties in White Pine County, U.S.A., has been announced by the Nevada Mines Division, of Kennecott. Kennecott was to take possession of its new holdings on February 1. Kennecott, Coppermines, and their predecessors have worked side by side at Ruth and Kimberly for fifty years. All Coppermines' ore has been milled, concentrated and smelted by Kennecott's reduction plant at McGill. It is anticipated that Kennecott will continue to process 21,000 tons of ore per day when it takes possession of the former Coppermines property. Early in January, Kennecott's Nevada, Utah and New Mexico divisions curtailed production by operating six days per week instead of seven.

★

A contract has been signed between the Gas Council (Great Britain) and the Constock Liquid Methane Corporation of America for the experimental importation into Great Britain of liquefied natural gas by sea (*vide The Mining Journal*, December 13, 1957, page 711). A cargo ship, jointly owned by the Gas Council and the Constock Liquid Methane Corporation, is being converted and will be able to carry about 2,000 tons of liquid natural gas. It is hoped that the first shipload will arrive in the Thames within about twelve months. If this experiment proves successful, the way will be open, subject to Government sanction, to the importation of liquefied natural gas in bulk. It is proposed to take the first trial loads of natural gas from the Gulf Coast oilfields.

★

Indications of uranium have been discovered in the Wankie area of Southern Rhodesia, states Barclays Bank D.C.O. Anglo American Rhodesian Mineral Exploration Ltd. is reported to be negotiating with the owners of some of the claims pegged. In the rest of the Colony the search for uranium has so far proved unsuccessful. The Bank also states that the U.K. Atomic Energy Authority's plans to establish a uranium processing plant have been shelved.

★

Inquiries being received by the Mines Department, Southern Rhodesia Government, regarding the discovery of emeralds have been so numerous that the department has issued a further statement. The discovery was made by a mining company in the Mweza range of hills, on Liebig's Ranch, outside the Belingwe Native Reserve. The area is remote and almost inaccessible in the rainy season. In collaboration with the company, the Government arranged for the small mineralized pocket containing the emeralds to be fenced and placed under police protection. Also as a protective measure, the Government declared an area surrounding the find to be reserved against prospecting. No mining is at present taking place, sufficient stones having been discovered on the surface to meet the immediate requirements of the emerald market. Such stones are being marketed through an existing trade channel, under Federal Government licence control. In due course the extent, in depth, of the existing find will be explored. The Government has no intention of nationalizing the find.

★

The Eagle-Picher Co. has announced that operations will be suspended at its zinc smelter at Henryetta, Oklahoma, because of the depressed domestic lead and zinc market. Operations were resumed in November after a four-month closing because of a contract dispute. The firm also suspended operations for five days last April.

★

Mathiessen and Hegeler Zinc Co. has announced that, effective about February 15, slab zinc production is to be reduced by about 850 tons a month at its Meadowbrook, West Virginia, smelter. This is in addition to a curtailment of about 1,000 tons a month in zinc output

The Breza brown coal mine, near Zenica, Yugoslavia, celebrated its fiftieth anniversary as a producer in December last year. The anniversary was marked by the largest annual output of the post-war period, as 650,000 tons were produced from Breza during 1957

at its Lasalle, Illinois, smelter, which was made last autumn.

★

The six leading Japanese copper smelters are to cut their production by 25 per cent to a level of 8,000 tons a month. This cut—the second major one in the Japanese industry—is part of a series of measures to offset the present recession in copper.

PERSONAL

Dr. S. W. K. Morgan, director of research at Imperial Smelting Corporation, Avonmouth, Bristol, has been honoured in the U.S. for his outstanding contribution to the minerals industry during 1957. The award for the "Technical Achievement of 1957" was made to him by *Mining World-World Mining*, the joint U.S. technical publications.

★

Mr. W. M. Rush has joined the board of the West Rand Investment Trust Ltd.

★

The Rhodesian Committee of Coronation Syndicate Ltd. has been reconstituted and now consists of Sir P. Bednall, Mr. C. V. Stevens, and Mr. R. S. Walker.

★

Mr. A. J. Wood has been appointed a director of Modderfontein B Gold Mines. Mr. N. W. S. Lewin has resigned from the board.

★

Monsieur Rene J. S. Mayer has joined the board of the Rio Tinto Co. Ltd.

★

Mr. Henry Beaufort Somerset has been elected president of the Australasian Institute of Mining and Metallurgy for 1958.

★

Following a recent survey of the market potential for their products in Australia, George Kent Ltd. have decided to establish a central organization there under the direction of Mr. E. E. Cook, whose position as home sales manager is being taken over by Mr. J. Tham. Mr. Cook expects to leave for Australia by sea on February 15.

★

Mr. W. E. Wright has retired from the board of the Pyrene Co. Ltd. and from control of the company's metal finishing division. Mr. H. F. Parshall, who has been on the board since 1947, now takes over board responsibility for the metal finishing division.

COMPANY EVENTS

Oil Feed Engineering Co., Ltd., of 18 Denbigh Street, Victoria, London, S.W.1, for many years manufacturers of high-pressure flexible hose assemblies, has become a member of the BTR group of companies, and will operate as the high-pressure hose division of the group. The new division makes available to all users the full resources of the BTR group, covering design, manufacture and marketing of industrial high-pressure hose, assemblies and allied products.

★

Phibrobelge, a limited company, has been formed in Brussels to trade in ores, metals and chemicals. The share capital of 1,000,000 Belgian frs. consists of 100 bearer shares of 10,000 frs. each, of which 47 were taken up by a U.S. corporation reported to be the Philipp Bros. Ore Corp.

★

Frank Samuels and Co. Inc., a subsidiary of Haile Mines Inc., has acquired the New York business and office of Nathan Trotter Co. Inc., of Philadelphia. This acquisition provides Haile's subsidiary with an integrated non-ferrous metal-importing business. Frank Samuels will act as agents for Straits and other pig-tin for Edward Boustead and Co. Ltd., of London.

★

From February 17, 1958, the address of the Professional Engineers Appointments Bureau will be 39 Victoria Street, London, S.W.1. The telephone number remains unchanged (Abbey 1737).

★

As from February 17, 1958, the transfer office of Consolidated Tin Smelters Ltd. will be situated at 68 Lombard Street, London, E.C.3.

CONFERENCES AND EXHIBITIONS

General meetings of the Institution of Mining and Metallurgy will be held on February 20, March 20, April 17 and May 15 (annual general meeting from 4 p.m.). The annual dinner will take place in London on May 5.

★

The annual dinner and dance of the North of England Institute of Mining and Mechanical Engineers will be held at Newcastle upon Tyne on February 27. General meetings will take place on April 16, June 6, August 8 and October 11.

★

The 1958 Mechanical Handling Exhibition and Materials Handling Convention, at Earls Court, London, from May 7 to 17, will be the largest display of labour-aiding equipment and methods ever presented to the world.

★

"The tin-can—still champion after 150 years" was the theme of the exhibit of the Malayan Tin Bureau at the 1958 Canners' Show, held at Atlantic City, New Jersey, from January 18-22.

★

Three thousand firms from twenty-three countries will be represented at the Spring Fair to be held in Utrecht (Netherlands) from March 18 to 27. The building machinery and materials-groups will include sections for road-making equipment, machinery and equipment for waterways construction, mining machinery, earth-moving equipment, and mechanical-handling equipment.

★

"Electricity and World Progress: Britain's Contribution" has been selected as the theme of the tenth British Electrical Power Convention, which will be held at Brighton from June 16 to 20 under the presidency of Sir George Nelson, Bart.

★

"Production Fights Inflation" will be the slogan of the third Production Exhibition and Conference, which is to be held in London in May this year. Its purpose is to show the best production technology applied in the U.K.

★

The Department of Mining Engineering at Montana School of Mines, actively assisted by the Mining Association of Montana, the Anaconda Co., the American Institute of Mining, Metallurgical and Petroleum Engineers, the Montana Society of Engineers and the Montana School of Mines, will sponsor a symposium concerned with the hydraulic emplacement of mine stope fill. The symposium will be held on the campus of the School of Mines on May 9 and 10, 1958.

★

A paper on exploration methods for naturally occurring raw materials, with particular reference to geophysics and drilling, will be delivered by specialists from Le Grand Sutcliff and Gell Ltd., at the Institute of Quarrying's "Third Short Course on Quarry Practice", which will be held at Leamington on February 27, 1958.

Canada's Shopping List—II.

A recent letter to shareholders states that Rexspar Uranium and Metals Mining Co. continues to work actively towards its goal of bringing a uranium mine to production at its property in Birch Island, B.C. The company has a contract with Eldorado Mining and Refining for the sale of $21,553,812 of uranium concentrates. It is reported to be "adequately financed for present needs" and is proceeding with its engineering work with a view to the start of production during the current year. A pilot plant is in operation, and areas where open-pit mining is expected to be first started have been prepared for mining. Some tenders have already been called for the construction of plant buildings and for part of the machinery and equipment.

★

The sharp decline in base-metal prices will not affect the plans of the Hudson Bay Mining and Smelting Co. to open new properties and expand their present facilities, states the president of the company. A $2,500,000 expansion programme for the Churchill River hydro-electric plant has been announced. A subsidiary will supply power at Island Falls, 75 miles north of Flin Flon (Manitoba) for the company's new mines being developed at Chisel Lake.

★

The Ontario Hydro-electric Power Commission has announced plans for two generating stations at a cost of $50,000,000 to boost the power supply to mining industries in northern Ontario. The stations are to be built at Red Rock and Otter Rapids. The former plant is scheduled for completion in 1960 and the latter for 1961. Each plant will have a capacity of 31,000 kW.

AGENCY WANTED

Sicol-Commercio e Industria Ltda., Rua Sacadura, Cabral, 115, Rio de Janeiro, Brazil, are anxious to contact U.K. suppliers of underwater drilling rigs and oil-field equipment. They are also interested in mining equipment. B.O.T. Ref. ESB/2053/58. Telephone inquiries to Chancery 4411, extension 776 or 866

CONTRACTS AND TENDERS

Union of South Africa

Tender No. H7127 calls for 100 s.tons of tin ingot of 99.7 per cent purity or better. Issuing authority, Stores Department, South African Railways. Bids to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. Closing date, February 26, 1958. B.O.T. Ref. ESB/3887/58. Telephone inquiries to Chancery 4411, extension 738 or 771.

Technical Briefs

Microbes Treat Ores and Coal

Microbes like those that cause illness and also provide antibiotics for combating disease, now are being studied by the U.S. Bureau of Mines as potential aids in recovering valuable metals from low-grade ores, for producing synthetic liquid fuels from oil shale, and for studying the structure of coal. Pioneering work in microbial research has begun on a small scale at four Bureau laboratories.

Promising recoveries of copper, nickel, cobalt, and other metals already have been obtained by the action of bacteria mixed with small samples of low-grade ores. These bacteria, which oxidize sulphur to acid, have enabled Bureau researchers to obtain many times the metal recovered in control experiments without bacteria. Other laboratory experiments using bacterial cultures have resulted in extraction of up to 99 per cent of the manganese in some ores.

Emphasizing that the work completed so far is only on a laboratory scale, it is pointed out that results justify the hope that microbes may one day find commercial application in helping man utilize mineral deposits.

The Bureau's microbial studies are not limited to the field of metallurgy. Other experiments are aimed specifically at finding out whether microbes can be used to recover hydrocarbons from oil shale, instead of the high-temperature retorting now required. Meanwhile, further research is furnishing information on the bacteria, yeasts, moulds, and other minute life forms in coals, and on the biochemical action of bacteria on chemicals like those found in coal.

PROTECTION OF TIMBER

A new process for flame-proofing timber has been announced jointly by Celcure and Chemical Co. Ltd., Glasgow, and Celcure Ltd., London, whose timber-preservation process by vacuum and pressure impregnation has been widely employed in the mining industry for more than thirty years.

Known as Celcure "F", the new treatment combines the full protection afforded by ordinary Celcure against all forms of wood-destroying fungi and insects with a very high degree of flame-proofing. Thus in a single treatment timber is protected against all its natural enemies, the cost in Britain being 3s. 10d. per cu. ft. for quantities of one standard or more.

Timber impregnated with Celcure "F", when exposed to fierce heat, gives off non-inflammable gases which dilute the combustible gases and prevent ignition. At the same time a viscous fluid is formed which excludes oxygen until dense charcoal is produced, which has the same effect. Since the formulation contains no chemicals likely to generate dangerous fumes if the treated timber is exposed to waste heat, as in a fire; it can be applied with safety to the protection of timber underground. The preservative element will not leach out.

The effectiveness of the treatment was demonstrated to *The Mining Journal* during tests in which small samples of both untreated and treated softwood were exposed to the flame from a blow-lamp, which normally produces a temperature of about 1,000/1,100 deg. F. After 45 seconds' exposure to the flame a sample consisting of small pieces of softwood measuring ½ in. x ½ in. x 3 in. cross-piled on a tripod was found to be burning freely. The same test was then applied for 1½ minutes to a similar sample treated with Celcure " F ". All flaming, glowing and smoking ceased when the flame was removed. A second sample treated with Celcure " F " was then exposed to a temperature of 2,000 deg. F. for one minute. As before, there was no flaming of the timber and all glowing and smoking ceased immediately. Within five seconds the pieces could be handled with ease.

Softwood treated with Celcure "F" was recently tested officially by the Department of Scientific and Industrial Research, Joint Fire Research Organization, Boreham Wood, and was awarded a Class I certificate. The report states that there was no spread of flame whatever on any of the test-pieces.

Treatment is almost immediately available in London, Southampton, Cardiff, Hull, Liverpool and Glasgow, and will shortly be extended to most of the thirty-four existing Celcure plants in the United Kingdom. The company also has nine plants operating or under construction in Africa, including the Union and Copperbelt, as well as treatment plants in many other countries. Mr. C. W. Nichol, managing director of Celcure Ltd., has intimated his company's readiness to meet the needs of the mining industry by the installation of conveniently situated plants wherever required.

LEAD BEATS CORROSION

The design and construction of Calera Mining Company's Garfield, Utah, cobalt refinery five years ago offered a number of unusual and difficult problems. These had to be solved by Chemical Construction Corp., which developed the solution process, and Calera's parent company, Howe Sound Co. One problem was the design of the oxidation autoclave, a cylindrical pressure vessel 40 ft. long and 6 ft. in diameter which had to operate at 600 p.s.i. in a temperature range of 400 to 450 deg. F.

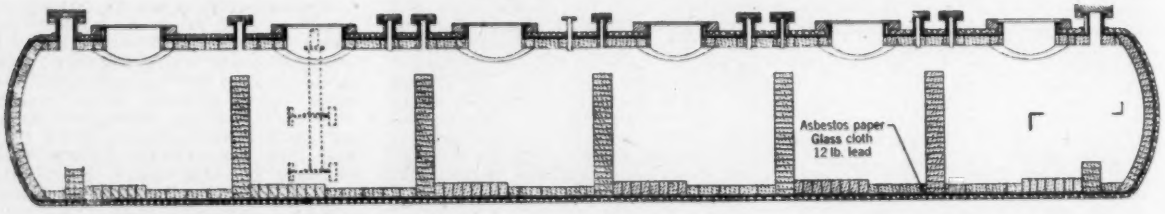
Originally of carbon steel construction, internally clad with a 10 per cent type 316 stainless steel, it was coated with Epon paint, followed by glass cloth and asbestos paper, both applied with sodium silicate, and a final lining of one course of acid-brick. The oxidized solution slurry contained 30 p.c. solids in the form of iron arsenate and calcium sulphate.

Two years ago the brick lining showed localized failure and examination, during repairs, revealed corrosion of the stainless and deterioration of the other supplementary materials. As a result the vessel was completely relined using a 12 lb. sheet lead membrane, glass cloth and asbestos paper applied with sodium silicate and one course of acid-brick.

The lead was purchased in 9 ft. by 25 ft. rolls, cut in lengths approximating one-half the vessel's circumference and placed so that seams were staggered. All seams were burned and lead nozzle liners were installed and burned to the shell liner. During installation and burning, overhead lead sections were supported by a ¾ in. plywood template, a segment of a cylinder about 6 ft. long, supported by cables passing through nozzle openings. The template was removed after the brick lining had been installed a course or so above the autoclave's horizontal centre line.

Linings of this type—a lead membrane with acid-brick to protect the lead from abrasion or erosion and to insulate it against high or fluctuating temperatures—have given excellent performance in many similar installations.

The lead acid-brick lined oxidation autoclave is divided into six equal compartments by acid-brick walls having overflow weirs at their upper extremities, thus allowing the oxidation slurry to flow from one compartment to the other



Metals and Minerals

Standardization of Manganese Ore Specifications

Mr. Gordon West, Technical Director of the British Standards Institution, led the British delegation to a meeting held recently in Russia by the I.S.O. (International Organization for Standardization) Technical Committee No. 65, which is concerned with manganese ore. Representatives were present from ten other countries, reports the *B.S.I. News*, namely: Bulgaria, Czechoslovakia, France, Germany, Hungary, India, Italy, Poland, Rumania, and the U.S.S.R. The purpose of this I.S.O. committee's work is the establishment of internationally agreed methods of analysis and sampling, so that buyers and sellers will clearly understand each other's specifications for manganese ore.

At this meeting the committee continued its consideration of methods for the analysis of ore. At its previous meeting fourteen methods had been completed, and at Moscow six further methods were agreed for determination of barium oxide, combined water, zinc (gravimetric method), vanadium (volumetric and photocolorimetric methods), titanium and calcium oxide and magnesium oxide.

The committee hopes to complete its work on chemical analysis at the next meeting, when methods will be considered for the determination of zinc by a polarographic method, metallic iron and chromium. The committee also proposes at its next meeting to continue consideration of sampling, and will have before it proposals for the sampling of ores in ships' holds and in stockpiles.

The establishment of ISO/TC65 was in itself an indication of the need for internationally accepted methods by which uniformity in specifications for manganese ore could be achieved. The importance of the committee's work is enhanced by the changing pattern of supply and the development of production from new deposits in various parts of the world.

On both sides of the Atlantic the demand for manganese ore is at present very small indeed, and prospects of any worth-while expansion during the first half of this year are regarded as far from encouraging. Until there is some pick-up in steel demand generally, the ore market is expected to remain subdued. In the absence of business, prices remain largely nominal. Consuming countries in Europe and elsewhere are reported to have covered their essential needs for 1958. Doubtless the good stocks which many countries are said to be holding has been an important factor in determining the amount of new ore required for the coming months. The United Kingdom's contracts with Russia are virtually completed, but it is believed that additional tonnages could be called for in the event of any expansion of demand later on.

*

The unsatisfactory tone of the ore market was doubtless responsible for the Indian Government's decision to abolish with immediate effect the export duty of 10 Rs. on ore in which the manganese content calculated as a percentage of the moisture-free ore is below 42 per cent. In announcing this decision, the Ministry of Commerce and Industry stated that the duty on manganese ore with 42-44 per cent manganese content would be reduced from 20 to 10 Rs. per ton; for material of 44 per cent and over, export duty will continue to be levied at 30 Rs. per ton. Export duties were imposed—perhaps not altogether judiciously—in the summer of 1956, when prices were rising steeply.

The prospect of a barter deal between the United States and India is regarded by trade sources in New York as unlikely at the present time. However, the possibility that, after some months, an agreement might be worked out to exchange American grain for Indian manganese ore, is not excluded.

*

Manganese ore reserves in the Udaipur and Banswara areas of Rajasthan have been estimated by the Geological Survey of India at approximately 250,000 tons. The reserves, which are from 30 to 50 ft. deep, are reported to contain 40 to 50 per cent of manganese. The estimates relate only to three areas where the deposits have been partly opened up. No further estimates could be made, states the report, because of the widely scattered and irregular nature of deposits. A considerable augmentation of ore reserves at the Tanberra belt is considered "probable". Detailed geological mapping and systematic prospecting are recommended to assess the potentialities of manganese ore in Rajasthan.

*

The Ethyl Corporation has announced in New York that a patent has been secured for a new anti-knock compound now being tested by several petrol firms. The experimental anti-knock agent, the first potentially commercial anti-knock since the introduction of tetraethyl lead, is said to be an organic compound of manganese.

*

Production of manganese nickel stainless steel in the United States continued to gain during the past year despite the setback in other major groups of stainless, reports the American Iron and Steel Institute on stainless and heat-resisting steel production. The total output of the new types 201 and 202, in which manganese replaces part of the nickel content, was 25,330 net tons, being an increase of nearly 6,000 tons over 1956, the first full year for the manganese-nickel types.

*

Comilog (Compagnie Minière de l'Ogooue), the company which plans to mine the manganese deposits at Franceville, French Equatorial Africa, has called for tenders for the construction of a 280 km. railway to carry the ore from the terminus of an 80 km. overhead cable railway to Pointe-Noire on the Atlantic coast.

RUSSIAN METAL SALES

The United States Government has been investigating the "sudden surge" of Russian non-ferrous metal exports, but has not yet found "indications of market-wrecking intent", reports the *Journal of Commerce* from Washington. Historically, Russia has not been an exporter of non-ferrous metals. Only manganese has been sold abroad in any quantity. Washington officials are at present inclined to believe that the recent Soviet ventures in tin—as well as in aluminium and other metals—have been primarily to pay for increasing imports from western Europe. The journal adds that figures soon to be released will show an increase of more than 30 per cent in Russia's overall trade with the West.

In London, the Aluminium Industry Council is considering Alcan's application to the Board of Trade for the imposition of an anti-dumping duty against Russian aluminium. The Council decided not to oppose the application, but this decision was not unanimous. Users and fabricators of 80 per cent of the primary aluminium deliveries of the United Kingdom in 1957 were in favour of not opposing the application, while only 5 per cent were definitely against such a course.

ALUMINIUM IN FRENCH AFRICA

Fria, the international company which plans to produce alumina from one of the two major bauxite finds in French Guinea, has signed a long-term agreement with the local government in French Equatorial Africa. The contract outlines the mutual undertakings of the company and the authorities, and includes long-term guarantees of stability for the company's legal, fiscal, financial and mining status.

TURKISH CHROME DEAL

Turkey has agreed to supply 150,000 tonnes of chrome ore worth about $5,000,000 to the United States. It is understood that deliveries will be made in large blocks spread over several months.

QUICKSILVER REMAINS FIRM

A much more buoyant tone continues to characterize the quicksilver market, and dealers now suggest a London ex-warehouse price of from £74 to £75 per flask compared with £74 previously. The available supplies on the spot are still in strong hands, while the rate of buying interest has recently quickened. The Spanish and Italian prices continue at about £80 per flask f.o.b., on which basis some sales were reported to certain destinations other than the United Kingdom. It remains to be seen whether the London price will move higher in relation to the spot New York price range of $220 to $225 per flask, which at the lower level is equivalent to about £73 5s., excluding the import duty of nearly $20. The coming weeks or months should reveal whether Spain and Italy, the world's two largest producers, are strong enough to maintain their asking prices.

NIOBIUM IN CANADA

The search for uranium in Canada led to the discovery of large reserves of the niobium mineral pyrochlore. However, as with most new minerals, a considerable amount of joint research by both industry and government proved to be necessary before commercial production could be expected. From recent reports of company operations it would appear that encouraging results are being achieved.

According to the *Northern Miner*, good progress is being made by Beaucage Mines in various phases of its metallurgical test in connection with the production of niobium metal from pyrochlore ores at North Bay, Ontario. When the pilot-plant investigation was concluded early in 1957, it was decided that a more economical extraction method was needed and that production of columbium metal, rather than columbium oxide, should be the objective. Research work on these problems has since been carried out, both by the Battelle Memorial Institute and by the Consolidated Mining and Smelting Co. of Canada.

Headway Red Lake Gold Mines and Coulee Lead and Zinc Mines are reported to be well pleased with the results of test work on their niobium flotation process. They believe that a process capable of economically concentrating the raw ore has been developed. Test work on a laboratory scale has produced a 99.8 per cent pure niobium pentoxide using a combination of flotation and chemical liquid-extraction processes. The overall recovery of niobium pentoxide was 80 per cent from ore containing between 0.25 and 0.30 per cent niobium pentoxide. Negotiations are now being carried on for the acquisition of a portion of the surface rights on the Oka property, which would enable the companies to carry on a mining operation should such be decided upon.

*

Meanwhile, despite the growing interest in niobium as a high-temperature and atomic material, the outlook for columbite producers still remains extremely difficult. Mr. C. A. P. Tarbutt, chairman and managing director of Jantar Nigeria Co. Ltd., in a recent statement to shareholders, said that part of the company's output for the current year was as yet unsold, and that finding a market for the surplus would be difficult if not impossible. He added that the outlook had not been improved by the Board of Trade's expressed intention to dispose of a proportion of its stockpile.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

During the last week the underlying weakness in the copper situation has resulted in lower prices, whilst the price level for the other three metals has remained approximately unchanged although once again a backwardation has been established in the tin market.

COPPER WEAKENS FURTHER

The price structure in the copper market has been weakened by two successive reductions in the Belgian price and a reduction of ½ c. per lb. to 23½ c. per lb. by the American customs smelters, and if it had not been for "bear" covering during the earlier part of this week, the actual price would probably be several pounds lower than it currently is. The main question of interest at the moment is whether or not the American producers will now lower their price to such an extent that the March calendar average becomes below 24 c. per lb., in which case a 2 c. import duty into the United States would become operative about the middle of April.

An additional talking point this week has been the commencement by the *Metal Bulletin* to publish a European Wire Bar price, which is the weighted daily average of business as reported by nine main producers who supply copper to Europe. It is being pointed out that this price is again an historical one, inasmuch as it reflects what has happened in the past, and is therefore of very little use to consumers. The object of the exercise is also a little obscure, as at present if any long-term contracts should be based on this new price, this would not be reflected in the price itself. So if reduced to absurdity, and all the copper in Europe was sold on the basis of the new price, there would then be no price at all, or alternatively, the price could be established by a sale of one ton at a price quite out of line with other international quotations. Most people are prepared to wait and see how the situation develops, but it is felt that any steps which create more prices for the same article must, under present circumstances, tend to depress the general price level.

The narrowing of the contango on the London market is still a mystery, as stocks in official warehouses this week showed a slight increase, thus disproving the theory that large tonnages were being taken out of warehouse and shipped across the Atlantic. The statistics which have become available during the period have also done little to strengthen the undertone of the market, as the Belgian Congo production during 1957 was only about 7,000 tons less than in 1956, and the Rhodesian Selection Trust figures show that the cutback in production at Roan and Mufulira was more than offset by an increased production at Chibuluma.

TIN SQUEEZE IN APRIL?

The tin market has had a steady undertone in spite of the establishment of a backwardation which, as said last week, is expected to be short-lived. The support necessary from the buffer stock manager has not had to be so massive as of late, in spite of an increase of 946 tons in the official stocks published on Monday, and which showed a total of 16,454 tons. Although doubts as to the stability of the scheme have been expressed in American circles, the announcement from Malaya that the government there is prepared to back the scheme to the hilt and that it was prepared to put up additional money as necessary, is probably a far better indication of the pool's future.

The other event in the week has been the registration by the Committee of the London Metal Exchange of a brand Russian tin, and this has given rise, again in American circles, to "bearish" talk. In London, however, it is realized that the act of registering a brand does not increase by one ton the available supplies, and it is known that consideration is being given to approaching Russia to ask them to join the International Tin Agreement.

A number of dealers have now reassessed the overall tin situation and have come to the conclusion that the amount of metal in the pipeline had been underestimated, and that the effects of the restrictions in export would not begin to be felt until well into March and would not become fully apparent until the middle of April. It is, however, believed that the tonnage of metal coming forward which will have to be absorbed by the buffer stock is steadily diminishing. On Thursday morning, the Eastern price was equivalent to £733⅛ per ton c.i.f. Europe.

IMPORTANT LEAD-ZINC CUTBACKS

The lead and zinc scene has been dominated by announcements from nearly all parts of the world of shutdowns or cutbacks in production, the most important of which is probably the decision by the Australian producers to cut production by one day a fortnight, although the cutback at the Tsumeb plant in South Africa will not be without its effect. The markets themselves have been without any highlights, as the present price levels are considered by most experts to be within a few pounds of the lowest possible.

The O.E.E.C. production of lead during December amounted to 51,956 tonnes, which was a few hundred tons more than the output in November. In the United States, the Bureau of Mines' figures for November show that producers' stocks increased during the month from 47,500 to 59,800 s.tons, with a very sharp decrease of 17 per cent in the consumption.

For zinc, the American Zinc Institute's figure for January shows a further rise of stocks in the hands of producers of 13,686 s.tons, a small reduction in output being matched by a corresponding loss in consumption.

Closing prices are as follows:

	Feb. 6		Feb. 13	
	Buyers	*Sellers*	*Buyers*	*Sellers*
COPPER				
Cash	£164½	£165	£160	£160½
Three months ..	£166	£166½	£161½	£161½
Settlement ..	£165		£160½	
Week's turnover	8,400 tons		8,600 tons	
LEAD				
Current ½ month	£73½	£73½	£73½	£73½
Three months ..	£73½	£73½	£73½	£73½
Week's turnover	5,275 tons		3,000 tons	
TIN				
Cash	£730	£730½	£730	£730½
Three months ..	£731	£731½	£729½	£730
Settlement ..	£730½		£730½	
Week's turnover	1,575 tons		1,375 tons	
ZINC				
Current ½ month	£65	£65½	£63½	£64½
Three months ..	£64	£64½	£63½	£63½
Week's turnover	7,175 tons		5,550 tons	

London Metal and Ore Prices appear on page 196.

Mining Finance

Better Than Nationalization !

Although the year ended September 30, 1957, was not at all unsatisfactory for San Francisco Mines of Mexico, mining operations at the present time are barely profitable.

This was stated by Mr. A. V. Conrad in his circulated address to shareholders, which appears on page 195. In addition to the problems which may almost be described as normal to a base metal producer at this time—falling prices, slackening demand, and rising stocks to finance—San Francisco Mines carries an unenviable burden in the form of Mexican production, export, and mercantile taxes. These are levied on the value of production, and in the year 1956-57 took £2,699,428, something over 90 per cent of the gross value of the company's production after deducting operating expenses.

The company is fighting back in the technical field. Certain metallurgical improvements aimed at better separation of the paid-for metals and higher concentration rather than overall improvement in recovery have been pushed forward during the past year, with the result that the grades of the three concentrates produced were showing considerable improvements at the year-end. This line of attack carries with it considerable economies in smelting and freight charges per lb. of metal, because these charges are levied on the gross tonnage of concentrates treated or railed, and not on the metallic content. Regrettably, Mr. Conrad feels that metallurgical efficiency is now at such a high level that scope for further improvement is limited.

Other factors which will help to alleviate the Mexican company's difficulties are the continuance of good development disclosures on the recently discovered veins near the north shaft of the Frisco Mine, and the fact that the company is provisionally regarded by the U.K. tax authorities as an O.T.C. The company's financial position, too, is strong, with current assets of £4,375,726 comparing with liabilities and provisions totalling £1,028,575. Nevertheless, Mr. Conrad thinks it would be optimistic to expect the company to earn significant profits in the current year.

LEAD-ZINC CUTBACKS IN AUSTRALIA

A new form of cutback is to be tried at the lead-zinc mines in the Broken Hill field, New South Wales.

An announcement from the London office of the Consolidated Zinc group said there was to be a reduction equivalent to one day's work per fortnight overall, but the actual method of implementing this policy was to be left in the hands of the individual mines. Since the normal working fortnight at Broken Hill consists of ten days, the shutdown will have the effect of a 10 per cent reduction in output.

Mr. F. B. Vern, secretary of Broken Hill South, said in Melbourne that he welcomed the move as a protective measure. It was a step in the right direction, and there would be some saving in costs. One saving which Mr. Vern may have had in mind is on the lead bonus, which will be reduced by 25 per

(*Continued on page* 194)

Not Much Room For Manoeuvre

The surprise of last week-end's quarterly report from the Rhodesian Selection Trust group of copper producers is the fact that at all three of the group's mines sales and production tonnages were up on the preceding quarter. In the case of Chibuluma, the youngest of the three, this was to be expected since the mine is still in the expansionary phase of development. Production at this property was also inflated by the smelting of accumulated stocks of ore for which capacity had not previously been available.

At the two older producers, Roan Antelope and Mufulira, the situation is somewhat different. Sales at these two mines are now running ahead of last year's figures, and production, while not showing such a substantial rise as sales, rose by about 10 per cent at Roan Antelope and 11 per cent at Mufulira. At first sight this appeared to be in direct contradiction to the cutback of 10 per cent announced by the R.S.T. chairman, Sir Ronald Prain during June last year.

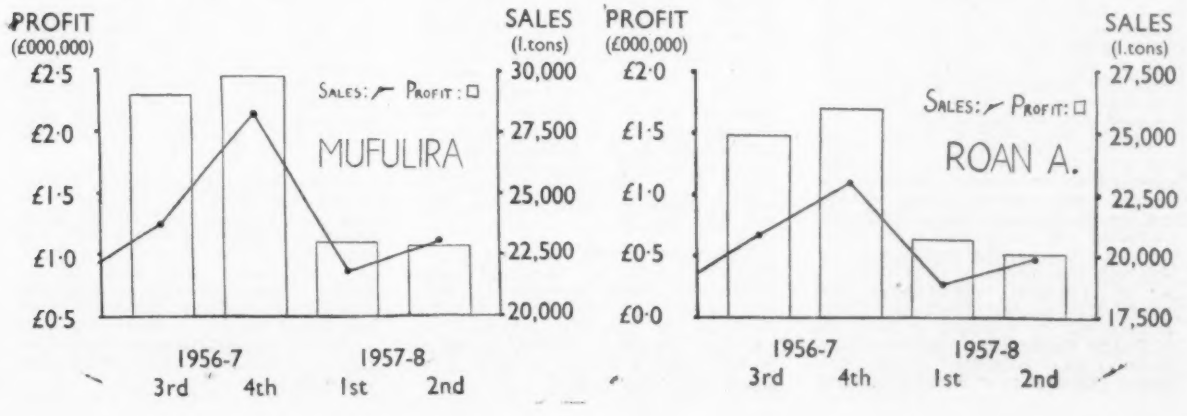
In Salisbury on Tuesday, an R.S.T. spokesman cleared up the confusion. Last June's cut, he said, was based on the production at that time, and not on the average production for the whole of the financial year which ended on June 30. A cut of 10 per cent on these figures would give 1957-58 production totals of 93,000 tons for Mufulira and 80,000 tons for Roan Antelope. Seen in this light, the increases in the December quarter did no more than to counterbalance the low-norm production in the three months to September.

Regarding sales, the spokesman said that figures for six months were not necessarily reliable when applied to the whole year. This seems to mean that there was some abnormal element in the December quarter's sales—possibly a slight increase in U.S. inventories in view of the possible 2 c. import duty.

All this, however, leaves one big question unanswered. Production costs at Mufulira in the December quarter rose by about £6 per ton to £136, while Roan Antelope's fell by around £7 per ton to £138. This was in a period of increased production. Next quarter it appears that production will have to fall by about 5 per cent as compared with the last, if the cutback is to be maintained. It would not be unreasonable, therefore, to assume that some upward tendency will be apparent in costs in the current quarter. With copper bearing heavily on the £160 per ton level, and the possibility of a U.S. duty depressing the price further, R.S.T. is not left with much room for manoeuvre.

The quarter's results are summarized below:

	Sales (000 *l.tons*)	*Profits* (£000)
Roan	19.9	512
Mufulira	23.2	1,068
Chibuluma ...	5.3	222



cent to about £A7 10s. per employee when the cut takes effect.

Another company spokesman in Melbourne quoted three main reasons for the action : the recession in consumer demand in the U.S.; the cessation of stockpiling by the U.S.; and the sales of metals from the U.K. stockpile.

TSUMEB SLOWS DOWN

Among this week's news of output reductions by base metal producers comes a statement from Mr. C. E. Stott, general manager of Tsumeb Corporation, that his company, South-West African producer of copper, lead, zinc, silver and cadmium, is to cut its ore output by about 20 per cent from present mill capacity. It is understood that Tsumeb's ore output this financial year, but for the cutback, would have been 700,000 tons.

This cut is similar to that announced by Rhodesian Anglo American for its copper producers, in that it partly represents a slowing down of expansion rather than an actual reduction. In fact, the effective rate of cut, compared with the output in the 1956 financial year of 625,000 tons, will be the less alarming figure of 11 per cent. It appears that underground development is to continue, and employees affected by the cutback will be employed in this way or in plant maintenance.

Important holders of interests in Tsumeb include American Metal Climax, Newmont Mining and Union Corporation.

UNION MINIERE IN 1957

Union Minière du Haut Katanga produced 240,200 tons of copper in 1957. This compares with 247,452 tons in 1956, and a 1957 target of 260,000 tons. This target would have been reached, it is stated, but for the difficult market conditions encountered. Cobalt production was also reduced, but production of the company's many accessory minerals (including uranium) was maintained at previous levels.

Two of the major elements in Union Minière's development programme have been deferred for two years to conserve cash resources.

CANADIAN URANIUM PRODUCERS' GOOD PROGRESS

Closely following the announcement at the beginning of the month by the Canadian Minister of Trade that about $105,000,000 worth of uranium will be sold to the U.K. in 1962-3 under the terms of a new contract, four of Canada's major producers of the fissile metal have released their results for 1957.

The report from Faraday Mines, covering as it does a period of only eight months from the commencement of production, makes exciting reading. During this period, Faraday milled 266,807 tons (including ore custom-milled for Greyhawk) for an operating profit before tax, write-offs and interest of $1,567,000. Mr. A. W. Johnston, vice-president and general manager, is confident that future earnings will be sufficient to meet the $8,500,000 sinking fund requirement and to leave an "adequate" profit. The present milling rate at Faraday of 1,300 tons daily compares with 1,028 tons daily handled during May.

Progress at Pronto Uranium Mines is continuing similarly. Gross revenue from production in 1957 was $11,080,000, an increase on the previous year of over 50 per cent, while average millhead value was 2.55 lb. per ton. Current throughput is 1,500 tons daily.

Lake Nordic shipped the first load of ore to Eldorado on November 30, and by January 16 had despatched 219,139 tons, worth about $2,200,000. Present mill capacity at this mine is some 2,000 tons daily, but a second mill circuit of 1,500 tons capacity is almost complete. The expansion programme contemplates a throughput of around 3,300 tons per day at the beginning of June.

Algom Uranium earned a net operating profit of $18,200,000 after tax but before write-offs in 1957. The two mills, Nordic and Quirke, treated a total of 1,990,381 tons at an average value of 2.32 lb. per ton for a revenue of $44,200,000. Average daily production rate at this company's mills is 2,851 tons.

WITWATERSRAND PRODUCTION IN 1975

According to a report of the Natural Resources Development Council research team, production from the gold mines on the Witwatersrand is likely to drop by 1975 to about 20 per cent of its present output. The research team was appointed in 1953 to make a planned survey of the Southern Transvaal and, having arrived at the above conclusion, has recommended that secondary industry be encouraged wherever possible and particularly where the decline in gold mining is most likely to have serious repercussions.

Lonrho Mines Do Well in 1957.—Under this heading in last week's *Mining Journal* output figures were given for five mines in the London and Rhodesian Group. We would like to make it clear that these figures referred to the company's financial years, which ended on June 30 last, and not to the calendar years.

F.S.G. Issue.—The 80s. rights issue by Free State Geduld was not entirely successful, only 520,791 of the 703,900 shares on offer having been subscribed for. The balance will be taken up in terms of the underwriting agreement.

Decrease in Rambutan Assets.—After making contributions to the buffer stock totalling £6,170, sharply reduced profits (1956, £49,421; 1957, £29,224) contributed to a reduction in Rambutan's net liquid assets in the year to June 30 last to £28,768. In his circulated statement the chairman, Mr. D. W. Thomas, says that although the full effect of the tin restriction scheme on the company, both in terms of reduced output and of cash, cannot yet be assessed, the repercussions will inevitably be serious. Meeting, Redruth, February 26.

Vereeniging Profits, Dividend Up.—Profits before tax of Vereeniging Estates in the year ended December 31, 1957, were £1,139,370 against £1,024,679 in the previous year. The final dividend is 5s. per stock unit which, with the interim of 2s. 6d., makes a total of 7s. 6d.—an increase of 1s. over 1956.

MARKET HIGHLIGHTS

Mining share markets, in common with many other sections of the Stock Exchange, presented a rather dreary picture in the week to February 12.

The Rhodesian Selection Trust group copper quarterlies were released over the week-end and were fairly well received. The actual fall in profits was generally considered to have been less than had been feared, but the share market gleaned little comfort from this in view of the fact that the current quarter's results must almost certainly be much worse unless a dramatic upswing in the metal price takes place.

R.S.T. drifted unhappily to 13s. 1½d. and Roan, partly sustained by a technical position in the shares, eased to 7s. Chartered were an exception to the general trend for a while and rose to 48s. 9d.; later, the shares went "ex-dividend" and on the lack of any further support drifted back to 45s. 3d. xd.

"Tanks" provided the weakest spot, because apart from the general adverse influences—including further cuts in the Union Minière copper price—a wave of Continental selling developed. This arose from the dislike of registered shares on the Continent (as opposed to bearer) and the fact that the pending "Tanks" scrip issue will take the registered form. As a result "Tanks" dropped in a few days from 98s. 9d. to 85s.

Lead-zincs, which had been pursuing a not very inspiring course, fell sharply on the news that current economic conditions had prompted a decision to reduce working time at the Australian Broken Hill field. Consolidated Zinc dropped 2s. 6d. to a three-year low of 44s. 3d. and among other losses Broken Hill South came back 2s. 6d. to 60s. San Francisco dropped to 15s. 9d. xd. on the annual report and fears that there might be no dividend paid for 1957-58.

Tins also gave ground, but trading was fairly quiet. Among many small price declines, Sungei Kinta eased to 15s. 6d. on the lower interim dividend.

In contrast, there was a quietly confident tone in gold shares. Business remained depressingly small, but although there were few features, prices gradually crept higher. A noticeably firm spot was Harmony where Cape buying touched off a recovery which lifted the shares 2s. to 31s.; the rise was accompanied by growing optimism that development from the new shaft will show good values.

Free State Saaiplaas, which had fallen to around 11s. 9d. on rumours that a new issue was in the wind, promptly about-turned and recovered to 13s. 1½d. on later rumours that the earlier rumours were unfounded! This interesting state of affairs stemmed from reports that Saaiplaas had withdrawn its application for the listing of additional shares on the Johannesburg Stock Exchange.

In the West African group, Ashanti moved ahead further (to 14s. 3d.) at one time on the high development values found at depth. The feeling about this share is that while the mine's prospects are undoubtedly good, those for the Ghana political situation are somewhat obscure. Nevertheless, good profits are still being earned in West Africa as shown by the Amalgamated Banket return for January, which lifted these shares to 1s.

SAN FRANCISCO MINES OF MEXICO

INCREASED PRODUCTION AND SALES

DECLINE IN BASE METAL PRICES PARTIALLY OFFSET

MR. A. V. CONRAD'S STATEMENT

The 45th Annual General Meeting of San Francisco Mines of Mexico, Limited, will be held on March 3 at the Chartered Insurance Institute, 20 Aldermanbury, London, E.C.2.

The following is the statement by the chairman, **Mr. A. V. Conrad,** which has been circulated with the report and accounts:

I am very sorry to have to report the death of Mr. Eric Fraenkel, a Director of this Company for the past fifteen years. His place on the Board has been filled by Mr. R. H. MacWilliam, whose appointment you will be asked to confirm.

The net profit for the year was £569,000. Adding £195,000 provided for taxes in 1955-56 and now no longer required and adding also the amount brought forward of £427,000 gives a total of £1,191,000 available for distribution. The Directors have transferred £200,000 to Contingencies Reserve and now recommend a final dividend of 3s. 3d. per unit of stock, which together with the interim dividend of 1s. 3d. per unit of stock already paid will, after deduction of income tax at 8s. 6d. in £, and after adding Directors' Additional Remuneration thereon, absorb £537,000, leaving £27,000 to be added to the Balance Carried Forward.

In view of the decline during the year in the prices of the base metals produced by the Company, Stockholders may have been agreeably surprised that the net profit was only £40,000 less than in the previous year. There are two principal reasons for this: First, the value of products sold, less marketing expenses and "gross taxes" thereon, fell by only £92,000, because not only was the production of lead and zinc greater than in the previous year, but sales exceeded production, particularly in the case of lead. Secondly, the amount charged in the accounts for Mexican and United Kingdom taxation on profits was less than half that in the previous year. The charge for Mexican income taxes was approximately halved, partly because a substantial amount of tax was assessed and charged in last year's accounts on the estimated profit on the closing stocks, whereas this year, on considerably smaller closing stocks, valued at lower metal prices, the tax assessable was much less—in fact, only £19,010. Stockholders will see from the Balance Sheet that we have on this occasion carried this sum forward as chargeable against future revenue; we propose to continue this practice in future years. The provision for United Kingdom taxation was also reduced as a consequence of the Company having been provisionally regarded by the Inland Revenue as an Overseas Trade Corporation.

An additional benefit arising from the Company being regarded as an Overseas Trade Corporation is that it will not be assessed to United Kingdom Income Tax on its 1955-56 profits. These profits were substantial, and as a consequence the Company saves the substantial sum of £195,000 previously provided for tax and now credited to the Appropriation Account.

Tonnage Milled

The tonnage milled was again a record, for the sixth consecutive year. However, the tonnage milled in the current year is likely to be somewhat lower owing to a breakdown of the North Shaft hoist. As a result, no ore could be hoisted in this shaft for fifteen days in October-November, 1957, reducing the mill intake by 18,000 tons. Work on installing the larger hoist referred to in my Statement a year ago is far advanced and is expected to be completed in the near future.

Metallurgy

Further improvements in mill metallurgy were made during the year. With the fall in metal prices, efforts were primarily devoted to increasing the production of paid-for metals by improving separation rather than by further reducing the loss of metal in tailings. Thus the percentage of lead contained in the ore milled which was recovered in the lead concentrates rose from 88.8 per cent to 89.6 per cent; the recovery of zinc in the zinc concentrates rose from 82.0 per cent to 83.8 per cent, and of copper in the copper concentrates from 46.5 per cent to 52.8 per cent. In addition, the grades of concentrates were again materially improved, the lead content of the lead concentrates averaging 64.9 per cent compared with 61.4 per cent in the previous year, the zinc content of the zinc concentrates 57.6 per cent compared with 55.9 per cent and the copper content of the copper concentrates 27.7 per cent compared with 26.1 per cent. By the end of the year the lead content of the lead concentrates had been increased to over 67 per cent. These improvements in the grades of concentrates produced provide welcome economies in smelting and freight charges per pound of paid-for metal, since these charges are levied on the tonnage of concentrates involved and not on their metallic content. The considerable improvements in metallurgy in recent years reflect great credit on the mill staff and on our Consultant, Mr. L. H. Lange, of the Galigher Co. Metallurgical efficiency is now at a high level and while we still hope for further improvements from the new crushing plant being installed, the scope for improvement is becoming limited.

Development

Development on the recently discovered veins near the North Shaft of the Frisco Mine continued to give satisfactory results during the year. Ore reserves were maintained and are sufficient to supply the mill at full capacity for more than six years. Moreover, reserves of broken ore were materially increased to a level which amply provides for production at the present rate.

Outlook

Stockholders are doubtless aware of the reduction in demand for, and the sharp fall in the prices of, lead and zinc and the further decline in the price of copper which has occurred in recent months. As a consequence, the Company's operations are now barely profitable. We are also having to finance rising metal stocks because we are currently unable to sell our entire output. Moreover, we are faced with a possible substantial increase in the near future in U.S. import duties on these metals which cannot but harm producers like ourselves. Unfortunately, in present circumstances, Mexican Production and Export Taxes bear on us more heavily than ever. But for them we could still earn profits. At the present time, they absorb more than 90 per cent of the net value of our production after charging operating costs but before deducting taxes—and Mexican income taxes take nearly half the balance! Continued attempts by the Mexican Mining Industry to secure statutory relief from these Production and Export Taxes have failed to bear fruit.

It would I think be optimistic to expect the Company to earn significant profits in the current year; indeed it may be fortunate to escape operating at a loss. However, the Company's financial position is good and its mines and plant in first-class order, enabling us to face the lean times ahead with confidence.

I am sure you will wish to join me in thanking Mr. H. B. Hanson, my colleague on the Board and our General Manager in Mexico, Mr. A. B. O'Neel, our Assistant General Manager, and their loyal staff for their persistent efforts in furthering the Company's fortunes.

February 4, 1958.

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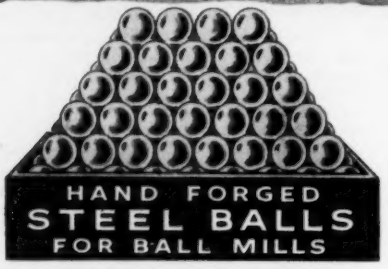

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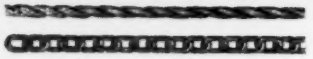
FOR BALL MILLS



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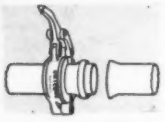
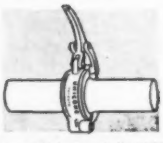
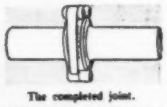


Rubber gasket in position and joint ready to pull over.



Pipe ends joined ready for locking.



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LONDON METAL AND ORE PRICES, FEB. 13, 1958

METAL PRICES

Aluminium, 99.5%, £197 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £190 per ton
Crude (70%) £190 per ton
Ore (60%) basis 19s. 6d./20s. 6d. nom. per unit, c.i.f.

Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 10s. 0d. lb.
Cerium (99% net), £13 18s. lb. delivered U.K.
Chromium, Cr. 99% 7s. 2d. lb.
Cobalt, 16s. lb.
Germanium, 99.99%, Ge. kilo lots 3s. 4d. per gram
Gold, 248s. 10½d.
Iridium, £26 oz. nom.
Lanthanum (98/99%) 15s. per gram.
Manganese Metal (96%-98%) £310
Magnesium, 2s. 5½d. lb.
Nickel, 99.5% (home trade) £600 per ton
Osmium, £25 oz. nom.
Osmiridium, nom.
Palladium, £7 10s. oz.
Platinum U.K. and Empire Refined £27/10 oz.
Imported £25 0s./£25 10s.
Quicksilver, £74/£75 ex-warehouse
Rhodium, £40/£42 oz.
Ruthenium, £15/£18 oz. nom.
Selenium, 53s. 6d. per lb.
Silver, 76½d. f. oz. spot and 76½d. f'd.
Tellurium, 15s. 16s. lb.

ORES AND OXIDES

Bismuth	65% 8s. 6d. lb. c.i.f. 20% 3s. 3d. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (semifriable) 48%	£17 5s. 0d. per ton c.i.f.
" Hard Lumpy 45%	£18 0s. 0d. per ton c.i.f.
" Refractory 40%	£12 5s. 0d. per ton c.i.f.
" Smalls 44%	£16 5s. 0d. per ton c.i.f.
Baluchistan 48%	£12 0s. 0d. per ton f.o.b.
Columbite, 65% combined oxides, high grade	nom.
Fluorspar—	
Acid Grade, Flotated Material	£22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF_2)	156s. 0d. ex works
Lithium Ore—	
Petalite min. 3½% Li_2O	47s. 6d./52s. 6d. per unit f.o.b. Beira
Lepidolite min. 3½% Li_2O	47s. 6d./52s. 6d. per unit f.o.b. Beira
Amblygonite basis 7% Li_2O	£26 5s. per ton f.o.b. Beira
Magnesite, ground calcined	£28 0s./£30 0s. d/d
Magnesite Raw (ground)	£21 0s./£22 0s. d/d
Manganese Ore Indian—	
Europe (46%-48%) basis 77s. 6d. freight	nom.
Manganese Ore (43%-45%)	nom.
Manganese Ore (38%-40%)	nom.
Molybdenite (85% basis)	8s. 5d. per lb. (f.o.b.)
Titanium Ore—	
Rutile 95/97% TiO_2 (prompt delivery)	£41/£42 per ton c.i.f. Aust'n.
Ilmenite 52/54% TiO_2	£11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%)	95s. 0d./100s. 0d. per unit c.i.f.
Vanadium—	
Fused oxide 90-95% V_2O_5	£10 per unit c.i.f.
Zircon Sand (Australian) (65-66% ZrO_2)	£16 per ton c.i.f.

MAP OF
THE KLERKSDORP
FIELD

★ While a mine is at the development stage, it is of vital importance to have a visual picture of its position in relation to the field as a whole. Otherwise the quarterly results published by the companies lose much of their significance.

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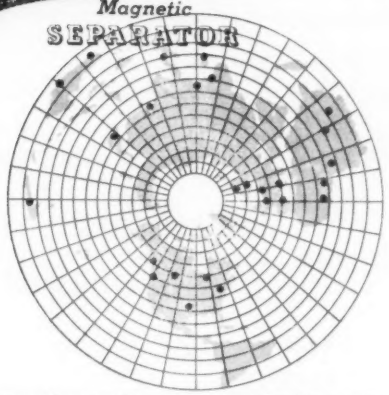

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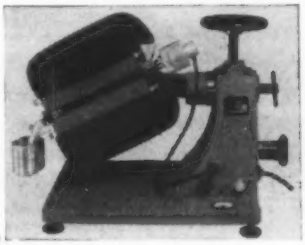

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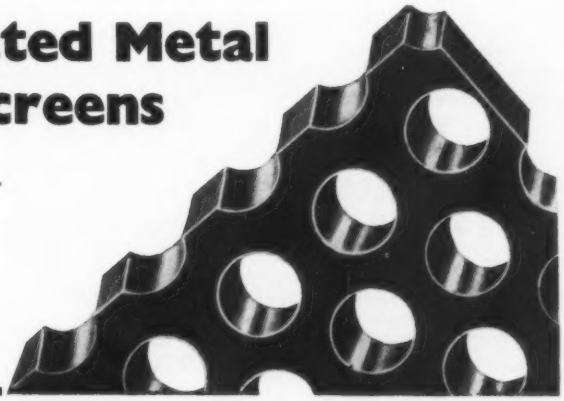

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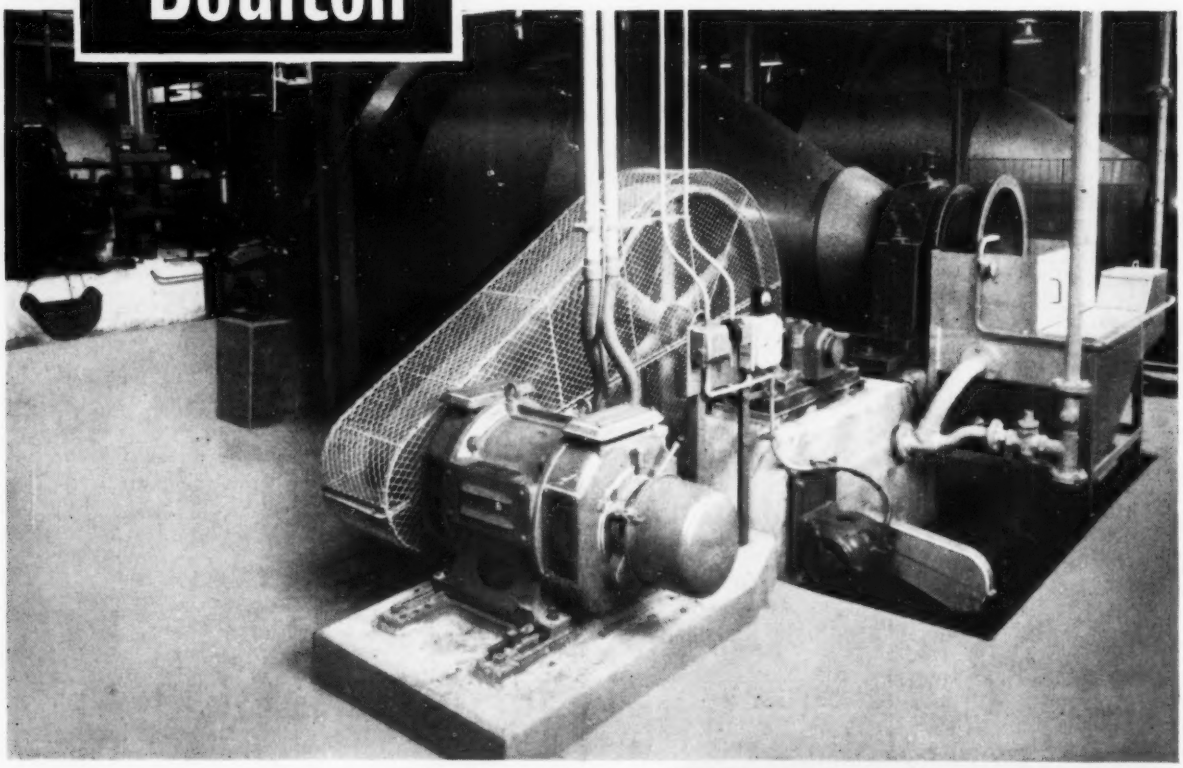

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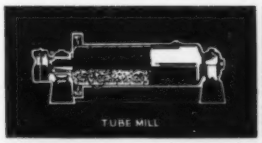

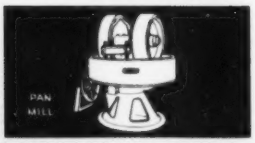

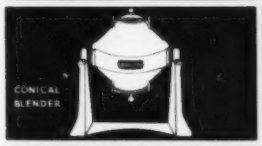

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